5-3810-207-10

TM 5-3810-207-10

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR'S MANUAL

CRANE-SHOVEL, BASIC UNIT, TRUCK MOUNTED 20 TON, 3/4 CU YD, GASOLINE DRIVEN, 6X6 (QUICKWAY MODEL M-200)

NON-WINTERIZED (FSN 3810-542-4982)

CRANE SERIAL NUMBERS 20–026 THROUGH 20–500
CARRIER SERIAL NUMBERS 59–026C THROUGH 59–500C

WINTERIZED TO MINUS 65 DEGREES (FSN 3810-542-4980)

CRANE SERIAL NUMBERS 20–001 THROUGH 20–025
CARRIER SERIAL NUMBERS 59–001C THROUGH 59–025C

This copy is a reprint which includes current pages from Changes 1,2,4 and 5.

HEADQUARTERS, DEPARTMENT OF THE ARMY

MAY 1962

READEX best copy available

SAFETY PRECAUTIONS

Before Operation

Always report or correct any conditions that may result in injury to personnel if operation is to be continued. Disengage the master clutch before greasing, oiling, or making any adjustments on the crane.

Keep the equipment free of grease, oil, and dirt. Always block the wheels of the carrier when parking on a grade, no matter how slight.

See that all adjustments are properly made and never operate a machine that is not properly adjusted.

Do not work on the engine unless the ignition switch is in the OFF position.

Do not fill the fuel tank while the engine is running.

When handling gasoline, always provide a metallic contact between the container and the tank. This will prevent a spark from being generated as gasoline flows over the metallic surfaces.

Before starting the engine, make certain the master clutch lever is disengaged.

Do not allow open flame or smoking around flammable material or when servicing the batteries.

During Operation

Always report or correct any conditions that may result in injury to personnel if operation is to be continued.

Avoid careless operating habits which will cause accidents to personnel. Keep the equipment free of grease, oil, and dirt.

Watch the dipper or load while it is moving. Stop operation at once when looking in another direction. When dumping into trucks, spot the trucks so the swing will be over the tailgate of the truck. Never swing the dipper over the truck cab.

Keep the boom safety cables attached to prevent raising the boom too high and collapsing it backwards, endangering the operator.

Always keep loaded buckets and crane loads within the safe working range, and keep sufficient clearance from high tension electric wires.

Keep the equipment on a firm base while operating, or use mats under the carrier.

Do not take chances on worn or frayed cables; replace them at once.

Do not allow personnel in the cab or on the load while the equipment is in operation.

Never lift a load unless it is hooked properly. Use sufficient line in hook block to handle the load.

When making heavy lifts with a high boom, use extreme care and try the load after lifting it off the ground to see that the brakes will hold the load. Never move loads over personnel or equipment.

Do not operate the engine in a closed building unless the exhaust gas is piped to the outside. The exhaust gases contain carbon monoxide, a colorless, odorless, deadly poison.

Do not fill the fuel tank while the engine is running.

When handling gasoline, always provide a metallic contact between the container and the tank. This will prevent a spark from being generated as gasoline flows over metallic surfaces.

When the crane is being operated, the main transmission gearshift lever should be moved to neutral position and the handbrake set.

After Operation

Always report or correct any conditions that may result in injury to personnel if operation is to be continued.

Never leave the crane or shovel with the dipper, bucket, or any crane load in a raised position. The brake may loosen just enough to cause the load to fall or allow the front end attachment to lower on personnel.

Keep the equipment free of grease, oil, and dirt. Do not leave the equipment on a bank or unstable parking place overnight.

Do not work on the engine unless the ignition switch is in the OFF position.

Do not fill the fuel tank while the engine is running. When handling gasoline, always provide a metallic contact between the container and the tank. This will prevent a spark from being generated as gasoline flow over the metallic surfaces.

DEPARTMENT OF THE ARMY TECHNICAL MANUAL **TM 5–3810–207–10**
DEPARTMENT OF THE AIR FORCE TECHNICAL ORDER **TO 36C23–3–37–21**
C 1

Operator's Manual

CRANE-SHOVEL, BASIC UNIT TRUCK MOUNTED: 20 TON, ¾ CU YD; GASOLINE DRIVEN, 6 x 6 (QUICKWAY MODEL M–200) NONWINTERIZED (FSN 3810–542–4982) CRANE SERIAL NUMBERS 20–026 THROUGH 20–500 CARRIER SERIAL NUMBERS 59–026C THROUGH 59–500C; WINTERIZED TO MINUS 65 DEGREES (FSN 3810–542–4980) CRANE SERIAL NUMBERS 20–001 THROUGH 20–025 CARRIER SERIAL NUMBERS 59–001C THROUGH 59–025C

TM 5–3810–207–10
TO36C23–3–37–21
CHANGES No. 1

DEPARTMENTS OF THE ARMY
AND THE AIR FORCE
WASHINGTON 25, D.C., *25 October 1962*

TM 5–3810–207–10, 22 May 1962, is changed as follows:

Pages 110 through 114, delete section III, paragraphs 53 and 54 and figure 58, and substitute new section III, paragraphs 53 and 54 and figure 58, as follows:

Section III. PREVENTIVE MAINTENANCE SERVICES

53. General

To insure that the equipment is ready for operation at all times, it must be inspected systematically, so that defects may be discovered and corrected before they result in serious damage or failure. The necessary Preventive Maintenance Services to be performed are listed consecutively and are described in paragraph 54. The item numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the unit shall be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noticed during operation which would damage the equipment if operation were continued. Defects or unsatisfactory operating characteristics beyond the scope of the operator to correct must be reported on DA Form 2404 at the earliest possible opportunity.

54. Daily Preventive Maintenance Services

The daily inspections and services that are to be performed by the operator or crew are listed and illustrated on figure 58.

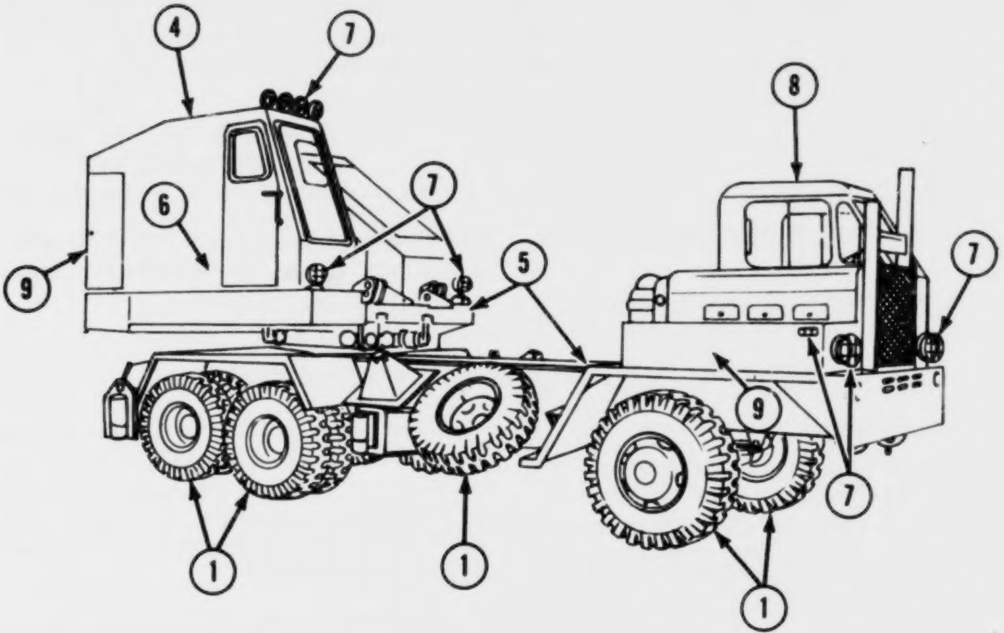
Note. Detailed instructions for the applicable maintenance procedures are referenced by the paragraph numbers listed.

PREVENTIVE MAINTENANCE SERVICES

DAILY

TM 5-3810-207-10

CRANE-SHOVEL, QUICKWAY MODEL M-200



CRANE AND CRANE CARRIER

LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

Item		Par. Ref.
1	TIRES AND WHEELS. Inspect tires for correct pressure (80 psi). Check for excessive wear, cuts, breaks, imbedded foreign matter, and missing valve caps.	
4	CRANE CAB. Inspect all glass for breaks and cracks. Check windshield wiper for proper operation.	
5	CARRIER AND CRANE FUEL TANKS. Fill prior to placing equipment in operation.	

Items 1, 4, 5

Figure 58. (Superseded) *Daily preventive maintenance services.*

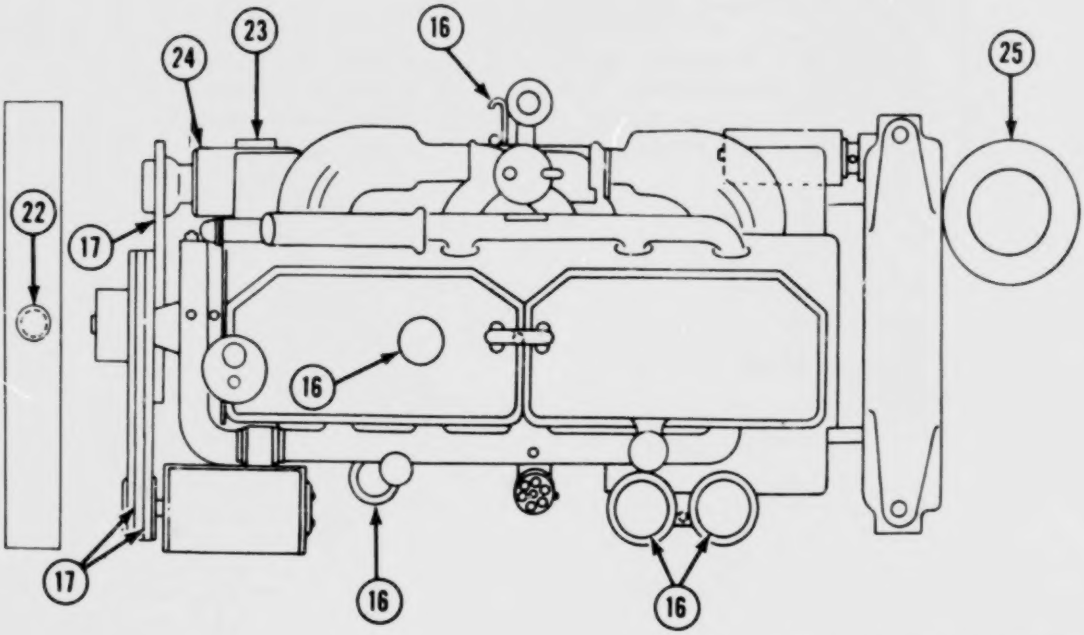
6	FIRE EXTINGUISHERS. Check the condition and inspect for full charge, proper working condition, and secure mounting. (Weekly)	46,47,48
7	HEADLIGHTS, FLOODLIGHTS, DOME LIGHTS, BLACKOUT AND MARKER LIGHTS. Inspect these items for damage, secure mounting, and proper operation.	
8	CARRIER CAB. Inspect the carrier cab, door, and glass for breaks, cracks, dents, and other damage. Inspect windshield wiper for proper operation.	
9	BATTERIES. Visually inspect the batteries for secure mounting, connections, and signs of leaks or damage. Check electrolyte level. The electrolyte level must be 3/8 inch above plates. (Weekly)	

EMC 3810-207-10/58 ①

Items 6 through 9

Figure 58—Continued.

PREVENTIVE MAINTENANCE SERVICES
DAILY
TM 5-3810-207-10
CRANE-SHOVEL, QUICKWAY MODEL M-200



CARRIER ENGINE

LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

Item		Par. Ref.
16	CARRIER ENGINE LUBRICATION SYSTEM. Check the engine oil level. Service in accordance with current LO.	
17	CARRIER BELTS AND PULLEYS. Inspect belts for deterioration, wear, and proper adjustment. Belt deflection midway between pulleys is 3/4 to 1 inch. (Weekly)	
22	CARRIER COOLING SYSTEM. Check coolant level. Proper coolant level is 3/4 inch above baffle.	
23	HYDRAULIC STEERING PUMP. Check oil level. Service in accordance with current LO.	

Items 16, 17, 22, 23

Figure 58—Continued.

24	AIR COMPRESSOR. Check air compressor for oil leaks, secure mounting, and other damage. Service breather as necessary.	
25	CARRIER ENGINE AIR CLEANER. Check the air cleaner for serviceable condition. Service in accordance with current LO.	

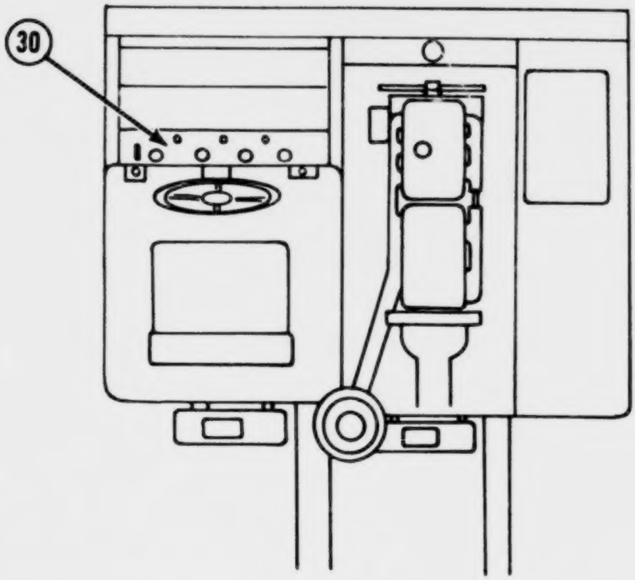
EMC 3810-207 10/58 ②

Items 24, 25

Figure 58—Continued.

PREVENTIVE MAINTENANCE SERVICES
DAILY

TM 5-3810-207-10
CRANE-SHOVEL, QUICKWAY MODEL M-200



CARRIER CAB

LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

Item		Par. Ref.
30	CARRIER INSTRUMENTS AND CONTROLS. Visually inspect the instruments and controls for broken glass and secure mounting. Check horn and windshield wiper for proper operation. Normal operating ranges for instruments should read as follows: Battery generator indicator-Green, Oil pressure warning light-Out with engine running, Coolant temperature warning light-Out with engine at normal temperature, Oil pressure gage-50 to 60 psi, Air pressure gage-80 to 105 psi.	

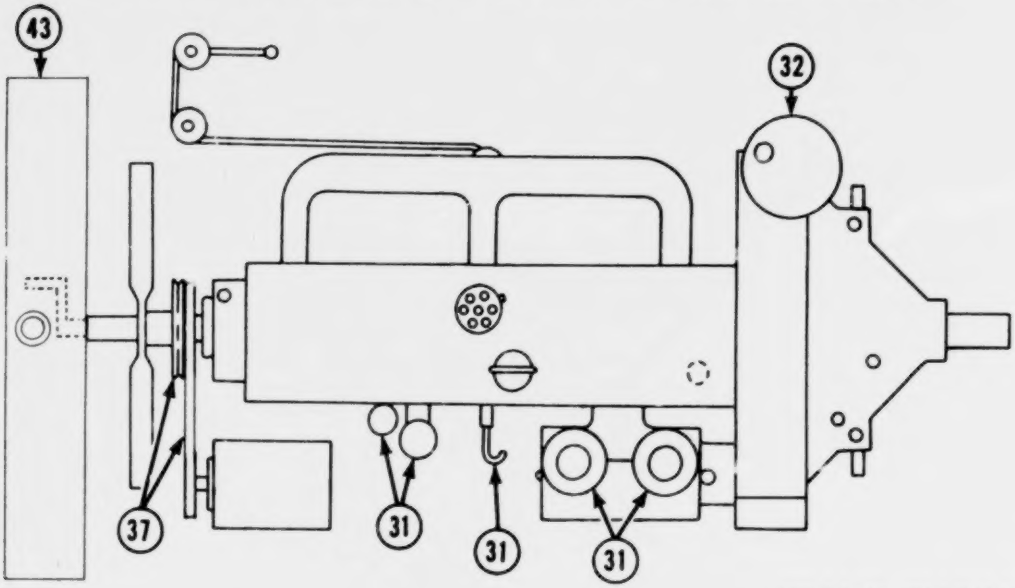
EMC 3810-207-10/58 ③

Item 30

Figure 58—Continued.

PREVENTIVE MAINTENANCE SERVICES
DAILY

TM 5-3810-207-10
CRANE-SHOVEL, QUICKWAY MODEL M-200



CRANE ENGINE

LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

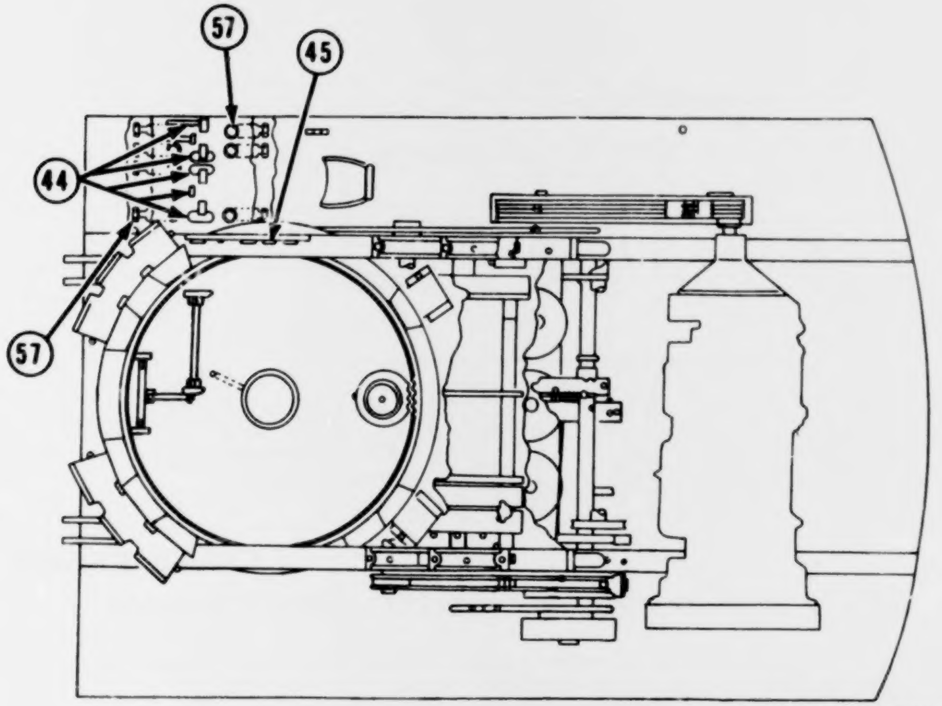
Item		Par. Ref.
31	CRANE ENGINE LUBRICATION SYSTEM. Check the engine oil level. Service in accordance with current LO.	
32	CRANE ENGINE AIR CLEANER. Check the air cleaner for serviceable condition. Service in accordance with current LO.	
37	CRANE FAN AND GENERATOR BELTS. Inspect the belts for deterioration, excessive wear, and proper adjustment. Belt deflection is 1/4 to 1/2 inch midway between pulleys. (Weekly)	
43	CRANE ENGINE COOLING SYSTEM. Check the coolant level. Proper coolant level is 3/4 inch above baffle.	

EMC 3810-207-10/58 ④

Items 31, 32, 37, 43

Figure 58—Continued.

PREVENTIVE MAINTENANCE SERVICES
DAILY
TM 5-3810-207-10
CRANE-SHOVEL, QUICKWAY MODEL M-200



MACHINERY DECK

LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

Item		Par. Ref.
44	CRANE CONTROL LEVERS, SWING LOCK, AND BRAKE PEDALS. Inspect these items for secure mounting and proper operation.	

Item 44

Figure 58—Continued.

45	CRANE ENGINE SWITCHES, INSTRUMENTS, AND GAGES. Visually inspect these items for breaks, secure mounting, and other damage. Check windshield wiper for proper operation. Normal operating ranges for instruments should read as follows: Ammeter 2 to 40 amperes, Coolant temperature 180°F, Oil pressure 40-50 psi. During operation listen for any unusual noises or loss of power while engine is under load.	
57	CRANE HYDRAULIC SYSTEM. Check oil level. Service as required. (See LO).	
NOTE 1.	OPERATION. During operation notice if unit has normal power and acceleration in each speed range as indicated on data plate. Inspect all hydraulic-controlled items for proper operation and function. Note any unusual noise in gear train.	
NOTE 2.	ADJUSTMENTS. Make all adjustments, within capability of operator, found necessary during operation.	
NOTE 3.	RECORDS. Make appropriate entries on applicable form used in inspecting, servicing, and repairing the equipment; sign the form and turn in to the proper authority.	

EMC 3810-207-10/58 ⑤

Items 45 and 57

Figure 58—Continued.

By Order of the Secretaries of the Army and the Air Force:

EARLE G. WHEELER,
General, United States Army,
Chief of Staff.

Official:

J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

CURTIS E. LeMAY,
Chief of Staff, United States Air Force.

Official:

R. J. PUGH,
Colonel, United States Air Force,
Director of Administrative Services.

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- USA SPWAR CD Agcy (2)
- USCONARC (3)
- OS Maj Comd (5) except
  - USARJ (10)
- USASETAF (2)
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  - USAES (100)
- GENDEP (OS) (2)
- Engr Sec, GENDEP (OS) (10)
- A Dep (2) except
  - Schenectady (4)
  - Atlanta (4)
  - Utah (4)
  - Memphis (4)
  - Granite City (4)
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- USA Trans Tml Comd (2)
- Army Tml (1)
- OSA (2)
- Engr Cen (5)
- Engr Fld Maint Shops (2)
- Div Engr (2) except
  - Lower Miss Valley (None)
  - North Central (None)
- Engr Dist (2) except
  - Buffalo (1)
  - Chicago (1)
  - Detroit (1)
  - Alaska (1)
  - Los Angeles (1)
  - New York (1)
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  - San Francisco (1)
  - Omaha (1)
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  - Kansas City (1)
  - Baltimore (1)
  - Ft Worth (1)
  - Eastern Ocean (1)
  - Philadelphia (1)
  - Rock Island (1)
  - St. Louis (1)
  - St Paul (1)
- USAERDL (3)
- AMS (3)
- Chicago Proc Ofc (10)
- EMC (26)
- ESCO (10)
- Fld Comd, DASA (8)
- Def Log Svc Cen (1)
- USACOMZEUR (2)
- USAREUR Engr Sup Con Agcy (10)
- USAREUR Engr Proc Cen (2)
- MAAG (1)
- JBUSMC (1)
- USA Corps (1)
- Units org under fol TOE: (2 copies each except as indicated)

3-117
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9-367
9-377
9-510 (CF, DF, DG)
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29-105
29-107
37-100
39-61
55-117
55-260
55-445
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55-469
55-500 (JB)
55-557
57-100

NG: State AG (3); units—same as Active Army except allowance is one copy to each unit.
USAR: Same as Active Army except allowance is one copy to each unit. For explanation of abbreviations use, see AR 320-50.

DEPARTMENT OF THE ARMY TECHNICAL MANUAL
DEPARTMENT OF THE AIR FORCE TECHNICAL ORDER

TM 5-3810-207-10
TO 36C23-3-37-21
C 2

Operator's Manual

CRANE-SHOVEL, BASIC UNIT, TRUCK MOUNTED: 20 TON, ¾ CU YD, GASOLINE DRIVEN, 6 X 6 (QUICKWAY MODEL M-200) NONWINTERIZED (FSN 3810-542-4982), CRANE SERIAL NUMBERS 20-026 THROUGH 20-500, CARRIER SERIAL NUMBERS 59-026C THROUGH 59-500C; WINTERIZED TO MINUS 65 DEGREES (FSN 3810-542-4980), CRANE SERIAL NUMBERS 20-001 THROUGH 20-025, CARRIER SERIAL NUMBERS 59-001C THROUGH 59-025C

TM 5-3810-207-10
TO 36C23-3-37-21
CHANGES No. 2

DEPARTMENTS OF THE ARMY
AND THE AIR FORCE
WASHINGTON 25, D.C., *5 November 1962*

TM 5-3810-207-10, 22 May 1962, is changed as folllows:

19. Movement to a New Work Site (Superseded)

a. When it is necessary to move the crane-shovel to another work site a short distance away, it may be driven under its own power with any of the attachments installed except the pile driver.

b. Position the crane boom in the boom rack, suspended 2 inches above the bottom support and secure the attachment to the front towing eyes of the carrier to prevent swinging of the attachment.

c. Position the back hoe or shovel attachment to the rear of machine and suspend at crane cab height.

Caution: Secure crane swing lock boom hoist safety pawl and operating brakes.

BY ORDER OF THE SECRETARIES OF THE ARMY AND THE AIR FORCE:

EARLE G. WHEELER,
General, United States Army,
Chief of Staff.

Official:

J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

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USA Arty CD Agcy (2)
USA Avn CD Agcy (2)
USA SPWAR CD Agcy (2)
OS Maj Comd (5) except
  USASETAF (2)
  USARJ (10)
MDW (1)
Armies (2)
Corps (2)
Div (2)
Engr Bde (1)
Svc Colleges (2)
Br Svc Sch (2) except
  USAES (100)
USMA (2)
GENDEP (OS) (2)
Engr Sec, GENDEP (10)
Engr Dep (OS) (10)
A Dep (2)
USA Trans Tml Comd (2)
Army Tml (1)
OSA (2)
Dist Engr (2) except
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  Chicago Dist Engr (1)
  Detroit Dist Engr (1)
  Alaska Dist Engr (1)
  Los Angeles Dist Engr (1)
  New Orleans Dist Engr (1)
  New York Dist Engr (1)
  Louisville Dist Engr (1)
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  San Francisco Dist Engr (1)
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  Kansas Dist Engr (1)
  Baltimore Dist Engr (1)
  Ft Worth Dist Engr (1)
  Eastern Ocean Dist Engr (1)
  Philadelphia Dist Engr (1)
  Rock Island Dist Engr (1)
  St Louis Dist Engr (1)
  St Paul Dist Engr (1)
Div Engr (2) except
  Lower Miss Valley Div Engr (None)
  North Central Div Engr (None)
Engr Fld Maint Shops (2)
USAERDL (3)
Engr Cen (5)
AMS (3)
USA Area Spt Comd (Chicago) (10)
USA Mbl Spt Cen (26)
ESCO (10)
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MAAG (1)
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Units org under fol TOE:
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  5–5
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5-237 (5)
5-262 (5)
5-267
5-278 (5)
5-279
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6-635
7-100
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9-167
9-217
9-227
9-367
9-377
9-510 (CF)
9-510 (DF-DG)
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57-100

NG: State AG (3); units — same as Active Army except allowance is one copy to each unit.

USAR: Same as Active Army except allowance is one copy to each unit.

For explanation of abbreviations used, see AR 320-50.

Changes in force: C 1 C 2 and C 4

TM 5-3810-207-10
C 4

CHANGE No. 4

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., *18 November 1968*

Operator's Manual

CRANE-SHOVEL, BASIC UNIT, TRUCK MOUNTED: 20 TON, ¾ CU YD, GASOLINE DRIVEN, 6 X 6, (QUICKWAY MODEL M-200) NON-WINTERIZED, FSN 3810-542-4982; WINTERIZED TO MINUS 65 DEGREES, FSN 3810-542-4980

TM 5-3810-207-10, 22 May 1962, is changed as follows:

Cover page and contents page are changed as shown above.

Page 3. Paragraph 1*d* is superseded as follows:

d. The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to DA Publications) and forwarded direct to Commanding General, U. S. Army Mobility Equipment Command, ATTN: AMSME-MPP, 4300 Goodfellow Boulevard, St. Louis, Mo. 63120.

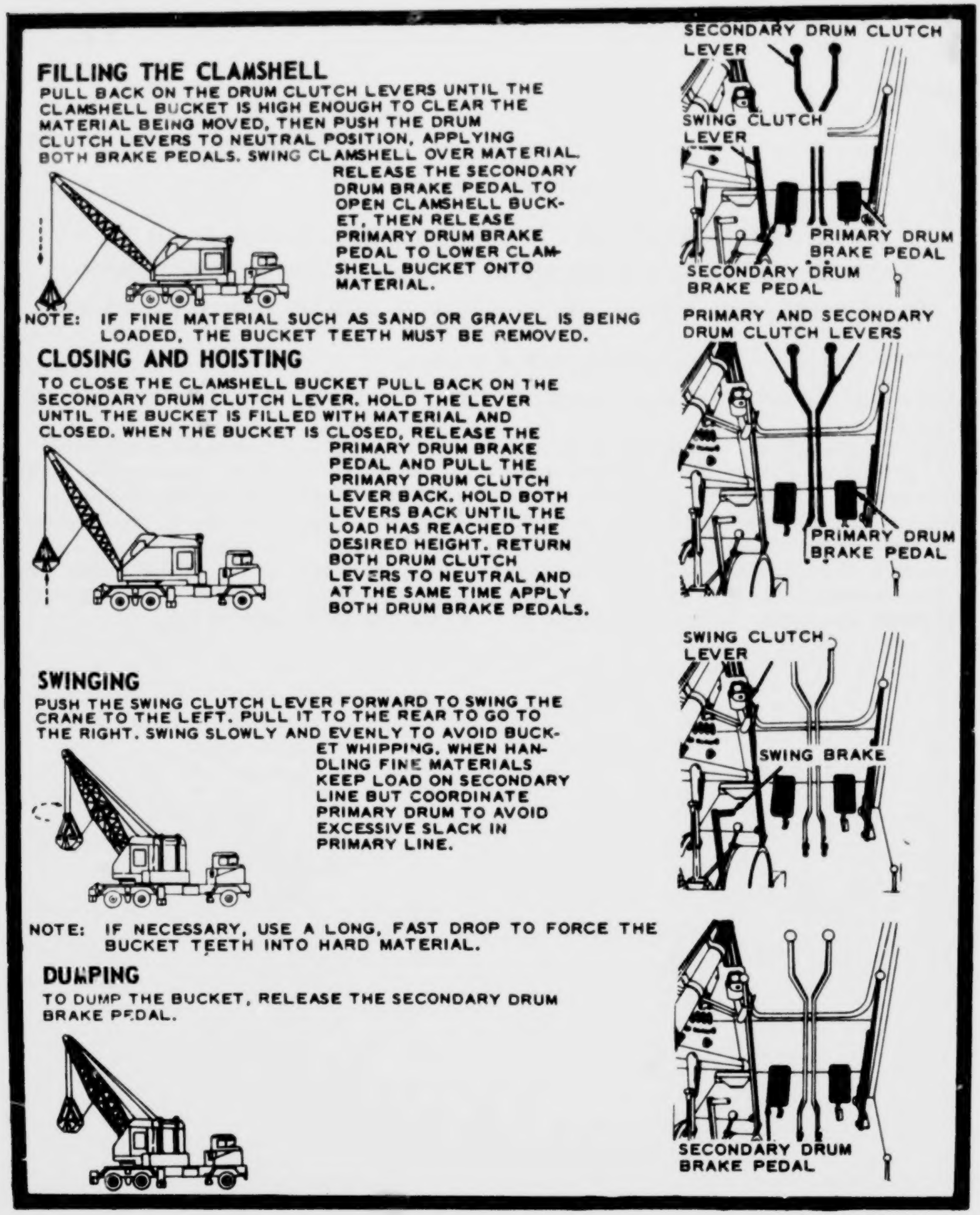
Paragraph 1*e* is superseded as follows:

e. Report all equipment improvement recommendations as prescribed by TM 38-750.

Page 6. Paragraph 4, line 2. Change "drain-shovel" to read "crane-shovel".

Page 56. Figure 38 (1), change callout "ENGINE STARTER SWITCH" to read "ENGINE STARTER BUTTON".

Page 70. Figure 44 is superseded as follows:



FILLING THE CLAMSHELL

PULL BACK ON THE DRUM CLUTCH LEVERS UNTIL THE CLAMSHELL BUCKET IS HIGH ENOUGH TO CLEAR THE MATERIAL BEING MOVED, THEN PUSH THE DRUM CLUTCH LEVERS TO NEUTRAL POSITION, APPLYING BOTH BRAKE PEDALS. SWING CLAMSHELL OVER MATERIAL. RELEASE THE SECONDARY DRUM BRAKE PEDAL TO OPEN CLAMSHELL BUCKET, THEN RELEASE PRIMARY DRUM BRAKE PEDAL TO LOWER CLAMSHELL BUCKET ONTO MATERIAL.

NOTE: IF FINE MATERIAL SUCH AS SAND OR GRAVEL IS BEING LOADED, THE BUCKET TEETH MUST BE REMOVED.

CLOSING AND HOISTING

TO CLOSE THE CLAMSHELL BUCKET PULL BACK ON THE SECONDARY DRUM CLUTCH LEVER. HOLD THE LEVER UNTIL THE BUCKET IS FILLED WITH MATERIAL AND CLOSED. WHEN THE BUCKET IS CLOSED, RELEASE THE PRIMARY DRUM BRAKE PEDAL AND PULL THE PRIMARY DRUM CLUTCH LEVER BACK. HOLD BOTH LEVERS BACK UNTIL THE LOAD HAS REACHED THE DESIRED HEIGHT. RETURN BOTH DRUM CLUTCH LEVERS TO NEUTRAL AND AT THE SAME TIME APPLY BOTH DRUM BRAKE PEDALS.

SWINGING

PUSH THE SWING CLUTCH LEVER FORWARD TO SWING THE CRANE TO THE LEFT. PULL IT TO THE REAR TO GO TO THE RIGHT. SWING SLOWLY AND EVENLY TO AVOID BUCKET WHIPPING. WHEN HANDLING FINE MATERIALS KEEP LOAD ON SECONDARY LINE BUT COORDINATE PRIMARY DRUM TO AVOID EXCESSIVE SLACK IN PRIMARY LINE.

NOTE: IF NECESSARY, USE A LONG, FAST DROP TO FORCE THE BUCKET TEETH INTO HARD MATERIAL.

DUMPING

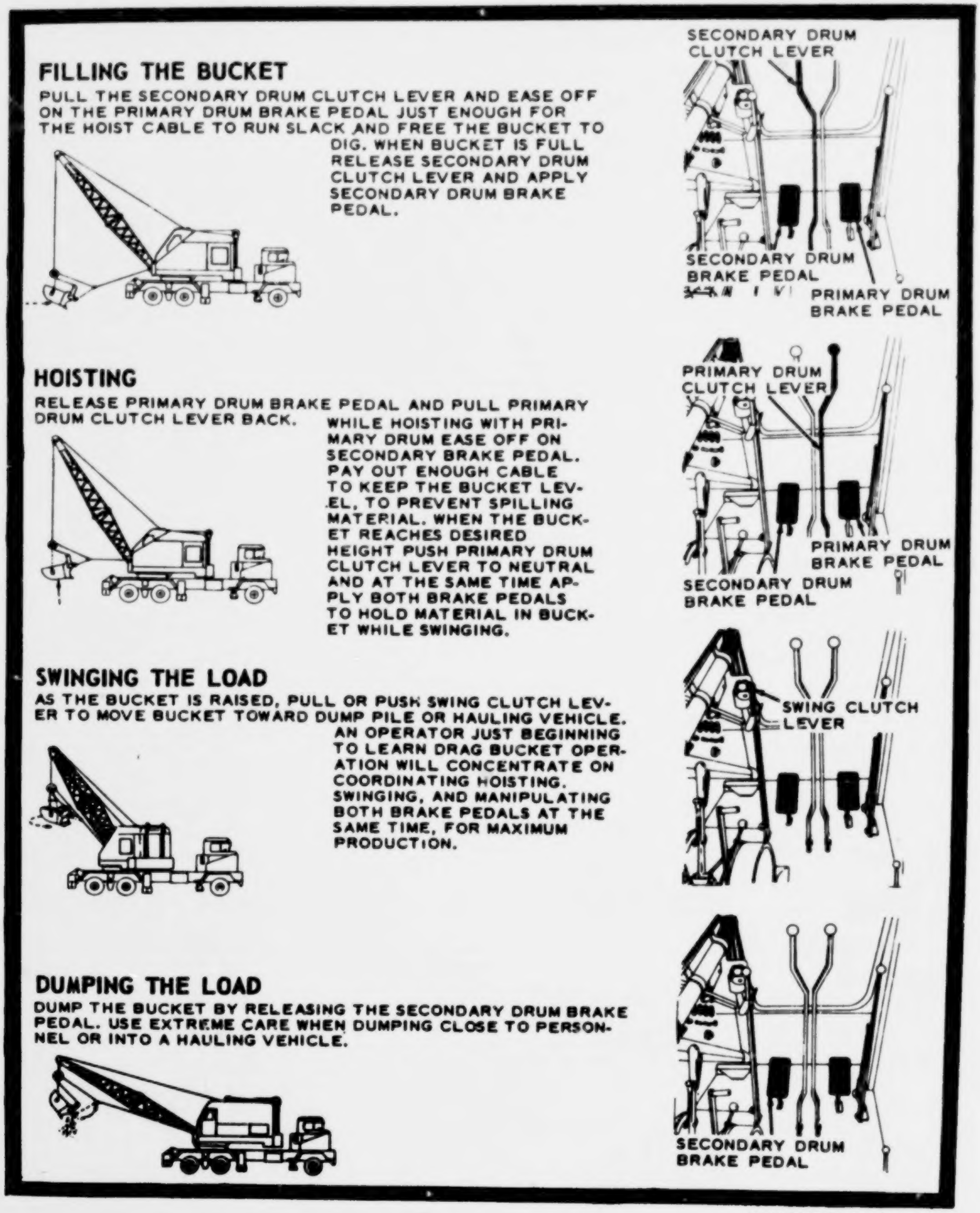
TO DUMP THE BUCKET, RELEASE THE SECONDARY DRUM BRAKE PEDAL.

SECONDARY DRUM CLUTCH LEVER
SWING CLUTCH LEVER
PRIMARY DRUM BRAKE PEDAL
SECONDARY DRUM BRAKE PEDAL
PRIMARY AND SECONDARY DRUM CLUTCH LEVERS
PRIMARY DRUM BRAKE PEDAL
SWING CLUTCH LEVER
SWING BRAKE
SECONDARY DRUM BRAKE PEDAL

ME 3810-207-10/44 C4

Figure 44. Clamshell operation and control positions.

Page 71. Figure 45 is superseded as follows:



FILLING THE BUCKET

PULL THE SECONDARY DRUM CLUTCH LEVER AND EASE OFF ON THE PRIMARY DRUM BRAKE PEDAL JUST ENOUGH FOR THE HOIST CABLE TO RUN SLACK AND FREE THE BUCKET TO DIG. WHEN BUCKET IS FULL RELEASE SECONDARY DRUM CLUTCH LEVER AND APPLY SECONDARY DRUM BRAKE PEDAL.

HOISTING

RELEASE PRIMARY DRUM BRAKE PEDAL AND PULL PRIMARY DRUM CLUTCH LEVER BACK. WHILE HOISTING WITH PRIMARY DRUM EASE OFF ON SECONDARY BRAKE PEDAL. PAY OUT ENOUGH CABLE TO KEEP THE BUCKET LEVEL, TO PREVENT SPILLING MATERIAL. WHEN THE BUCKET REACHES DESIRED HEIGHT PUSH PRIMARY DRUM CLUTCH LEVER TO NEUTRAL AND AT THE SAME TIME APPLY BOTH BRAKE PEDALS TO HOLD MATERIAL IN BUCKET WHILE SWINGING.

SWINGING THE LOAD

AS THE BUCKET IS RAISED, PULL OR PUSH SWING CLUTCH LEVER TO MOVE BUCKET TOWARD DUMP PILE OR HAULING VEHICLE. AN OPERATOR JUST BEGINNING TO LEARN DRAG BUCKET OPERATION WILL CONCENTRATE ON COORDINATING HOISTING, SWINGING, AND MANIPULATING BOTH BRAKE PEDALS AT THE SAME TIME, FOR MAXIMUM PRODUCTION.

DUMPING THE LOAD

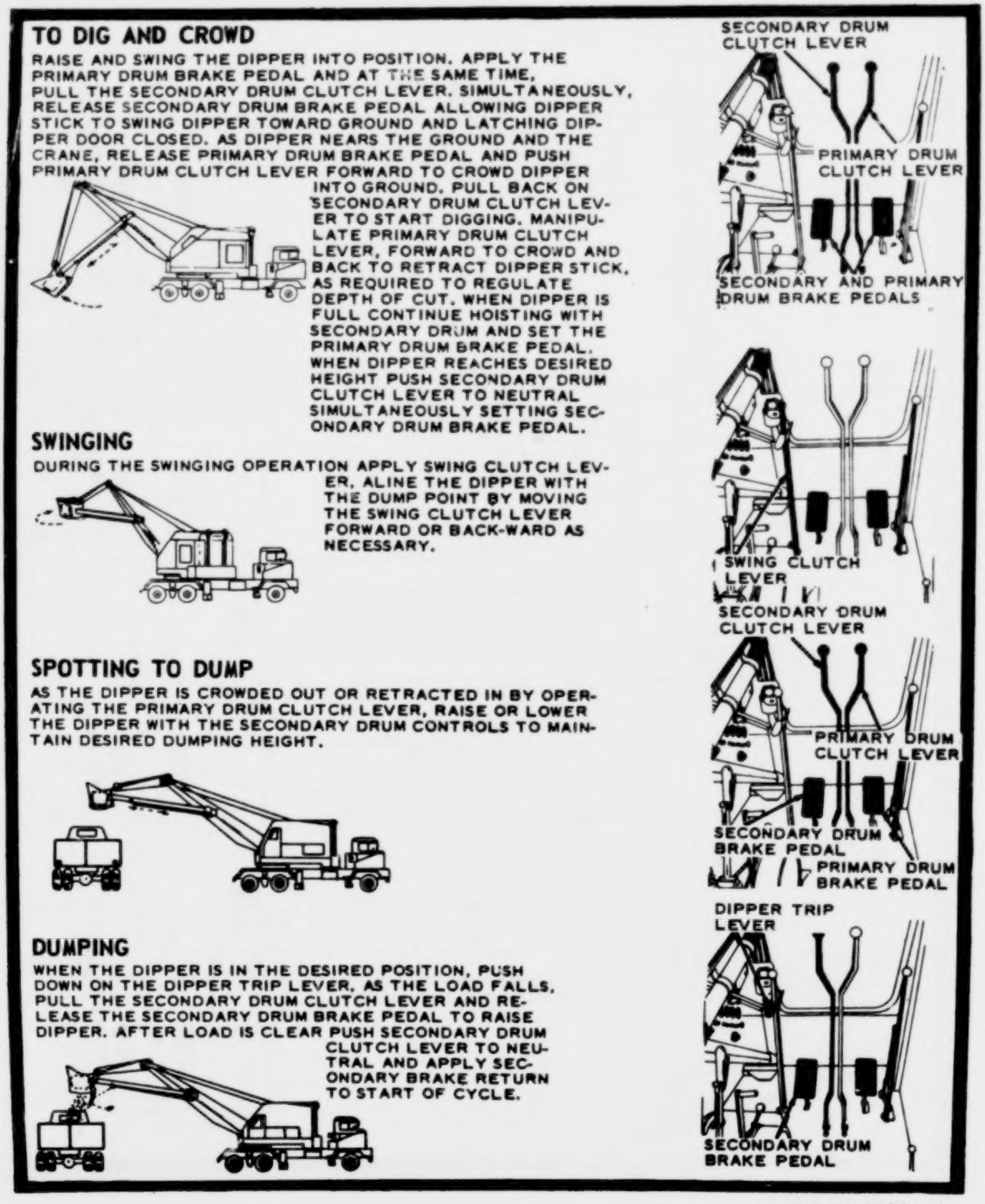
DUMP THE BUCKET BY RELEASING THE SECONDARY DRUM BRAKE PEDAL. USE EXTREME CARE WHEN DUMPING CLOSE TO PERSONNEL OR INTO A HAULING VEHICLE.

SECONDARY DRUM CLUTCH LEVER
SECONDARY DRUM BRAKE PEDAL
PRIMARY DRUM BRAKE PEDAL
PRIMARY DRUM CLUTCH LEVER
PRIMARY DRUM BRAKE PEDAL
SECONDARY DRUM BRAKE PEDAL
SWING CLUTCH LEVER
SECONDARY DRUM BRAKE PEDAL

ME 3810-207-10/45 C4

Figure 45. Dragline operation and control positions.

Page 73. Figure 47 is superseded as follows:



TO DIG AND CROWD

RAISE AND SWING THE DIPPER INTO POSITION. APPLY THE PRIMARY DRUM BRAKE PEDAL AND AT THE SAME TIME, PULL THE SECONDARY DRUM CLUTCH LEVER. SIMULTANEOUSLY, RELEASE SECONDARY DRUM BRAKE PEDAL ALLOWING DIPPER STICK TO SWING DIPPER TOWARD GROUND AND LATCHING DIPPER DOOR CLOSED. AS DIPPER NEARS THE GROUND AND THE CRANE, RELEASE PRIMARY DRUM BRAKE PEDAL AND PUSH PRIMARY DRUM CLUTCH LEVER FORWARD TO CROWD DIPPER INTO GROUND. PULL BACK ON SECONDARY DRUM CLUTCH LEVER TO START DIGGING. MANIPULATE PRIMARY DRUM CLUTCH LEVER, FORWARD TO CROWD AND BACK TO RETRACT DIPPER STICK, AS REQUIRED TO REGULATE DEPTH OF CUT. WHEN DIPPER IS FULL CONTINUE HOISTING WITH SECONDARY DRUM AND SET THE PRIMARY DRUM BRAKE PEDAL. WHEN DIPPER REACHES DESIRED HEIGHT PUSH SECONDARY DRUM CLUTCH LEVER TO NEUTRAL SIMULTANEOUSLY SETTING SECONDARY DRUM BRAKE PEDAL.

SWINGING

DURING THE SWINGING OPERATION APPLY SWING CLUTCH LEVER, ALINE THE DIPPER WITH THE DUMP POINT BY MOVING THE SWING CLUTCH LEVER FORWARD OR BACK-WARD AS NECESSARY.

SPOTTING TO DUMP

AS THE DIPPER IS CROWDED OUT OR RETRACTED IN BY OPERATING THE PRIMARY DRUM CLUTCH LEVER, RAISE OR LOWER THE DIPPER WITH THE SECONDARY DRUM CONTROLS TO MAINTAIN DESIRED DUMPING HEIGHT.

DUMPING

WHEN THE DIPPER IS IN THE DESIRED POSITION, PUSH DOWN ON THE DIPPER TRIP LEVER. AS THE LOAD FALLS, PULL THE SECONDARY DRUM CLUTCH LEVER AND RELEASE THE SECONDARY DRUM BRAKE PEDAL TO RAISE DIPPER. AFTER LOAD IS CLEAR PUSH SECONDARY DRUM CLUTCH LEVER TO NEUTRAL AND APPLY SECONDARY BRAKE RETURN TO START OF CYCLE.

SECONDARY DRUM CLUTCH LEVER
PRIMARY DRUM CLUTCH LEVER
SECONDARY AND PRIMARY DRUM BRAKE PEDALS
SWING CLUTCH LEVER
SECONDARY DRUM CLUTCH LEVER
PRIMARY DRUM CLUTCH LEVER
SECONDARY DRUM BRAKE PEDAL
PRIMARY DRUM BRAKE PEDAL
DIPPER TRIP LEVER
SECONDARY DRUM BRAKE PEDAL
ME 3810-207-10/47 C4

Figure 47. Shovel operation and control positions.

Page 157. APPENDIX II. BASIC ISSUE ITEMS LIST is superseded as follows:

APPENDIX II

BASIC ISSUE ITEMS LISTS

Section 1. INTRODUCTION

1. Scope

This appendix lists items which accompany the crane-shovel or are required for installation, operation, or operator's maintenance.

2. Explanation of Columns

The following provides an explanation of columns in the tabular list of Basic Issue Items, Section II.

a. Source, Maintenance, and Recoverability Codes (SMR), Column (1).

Note. Common hardware items known to be readily available in Army supply will be assigned maintenance codes only. Source codes, recoverability codes, and quantity authorized will not be assigned to this category of items.

(1) Source Code, indicates the selection status and source for the listed item. Source code is:

Code	*Explanation*
P	Applied to repair parts which are stocked in or supplied from GSA/DSA or Army supply system, and authorized for use at indicated maintenance categories.

(2) Maintenance Code, indicates the lowest category of maintenance authorized to install the listed item. The maintenance level code is:

Code	*Explanation*
C	Operator/crew

b. Federal Stock Number, Column (2). This column indicates the Federal stock number for the item.

c. Description, Column (3). This column indicates the Federal item name and any additional description of the item required.

d. Unit of Measure, Column (4). This column indicates the unit used as a basis for issue, e.g. ea, pr, ft, yd, etc.

e. Quantity Incorporated in Unit, Column (5). This column indicates the quantity of the item used in the functional group.

f. Quantity Furnished With Equipment, Column (6). This column indicates the quantity of an item furnished with the equipment.

g. Illustration, Column (7). This column is divided as follows:

(1) *Figure Number, column (7)(a).* Indicates the figure number of the installation in which the item is shown.

(2) *Item Number, column (7)(b).* Indicates the callout number used to reference the item in the illustration.

3. Abbreviations

ea	each

Section II. BASIC ISSUE ITEMS

(1) SMR Code	(2) Federal stock No.	(3) Description	(4) Unit of meas	(5) Qty inc in unit	(6) Qty furn with equip	(7) Illustration	
						(a) Fig. No.	(b) Item No.
		GROUP 31 — BASIC ISSUE ITEMS MANUFACTURER INSTALLED 3100 — BASIC ISSUE ITEMS MANUFACTURER OR DEPOT INSTALLED					
PC	7510-889-3494	BINDER, LOG BOOK	EA		1		
PC	7520-559-9618	CASE, MANUAL	EA		1		
PC	2950-045-9611	CASE, RIFLE, M-14 or M-16	EA		1		
PC	4210-889-2221	EXTINGUISHER, FIRE	EA		1		
PC		DA TECHNICAL MANUAL TM 5-3810-207-10	EA		1		

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff.

Official:
KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

Distribution:

To be distributed in accordance with DA Form 12-25, Section II (qty rqr block No. 361) Operator Maintenance requirements for Crane-shovels, trucks mounted 20 ton.

Changes in force: C1, C2, C4, and C5

TM 5-3810-207-10
C5

Change }
No. 5 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D. C. *7 July 1972*

Operator's Manual
CRANE-SHOVEL, BASIC UNIT, TRUCK MOUNTED: 20 TON, 3/4 CU. YD., GASOLINE DRIVEN, 6X6, (QUICKWAY MODEL M-200) NON-WINTERIZED, FSN 3810-542-4982; WINTERIZED TO MINUS 65 DEGREES, FSN 3810-542-4960

TM 5-3810-207-10, 22 May 1962 is changed as follows:

Page 1. Change title of Appendix II as follows:

APPENDIX II. BASIC ISSUE ITEM LIST AND ITEMS TROOP INSTALLED OR AUTHORIZED

Page 157. Appendix II and this portion of Change 4 is superseded as follows:

APPENDIX II
BASIC ISSUE ITEM LIST AND ITEMS TROOP INSTALLED OR AUTHORIZED

Section I. INTRODUCTION

1. Scope

This appendix lists basic issue items, items troop installed or authorized which accompany the Crane-Shovel and required by the crew/operator for operation, installation, or operator's maintenance.

2. General

This basic issue items, items troop installed or authorized list is divided into the following sections:

a. Basic Issue Items List—Section II. "Not Applicable".

b. Items Troop Installed or Authorized List—Section III. A list, in alphabetical sequence of items which at the descretion of the unit commander may accompany the end item, but are NOT subject to be turned in with the end item.

3. Explanation of Columns

The following provides an explanation of columns in the tabular list of Basic Issue Items List, Section II, and Items Troop Installed or Authorized, Section III.

a. Source, Maintenance, and Recoverability Code (s) (SMR):

(1) Source code, indicates the source for the listed item. Source code is:

Code	Explanation
P	Repair parts, special tools and test equipment supplied from GSA/DSA or Army supply system and authorized for use at indicated maintenance levels.

(2) Maintenance code, indicates the lowest level of maintenance authorized to install the listed item. The maintenance level code is:

Code	Explanation
C	Crew/Operator

(3) Recoverability code, indicates whether unserviceable items should be returned for recovery or salvage. Items not coded are nonrecoverable. Recoverability codes are:

Code	Explanation
R	Applied to repair parts (assemblies and components), special tools and test equipment which are considered economically reparable at direct and general support maintenance levels.
S	Repair parts, special tools, test equipment and assemblies which are economically reparable at DSU and GSU activities and which normally are furnished by supply on an exchange basis.

b. Federal Stock Number. This column indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. Description. This column indicates the Federal item name and any additional description of the item required.

d. Unit of Measure (U/M). A 2 character alphabetical abbreviation indicating the amount or quantity of the item upon which the allowances are based, e.g., ft, ea, pr, etc.

e. Quantity Furnished With Equipment, (BIIL only). This column indicates the quantity of an item furnished with the equipment.

f. Quantity Authorized (Items Troop Installed or Authorized Only). This column indicates the quantity of the item authorized to be used with the equipment.

g. Illustration (BIIL only). This column is divided as follows:

(1) *Figure number.* Indicates the figure number of the illustration in which the item is shown.

(2) *Item number.* Indicates the callout number used to reference the item in the illustration.

Section III. ITEMS TROOP INSTALLED OR AUTHORIZED LIST

(1) Smr Code	(2) Federal stock No.	(3) Description		(4) Unit of Meas	(5) Qty Auth
		Ref No. & mfr Code	Usable on Code		
PC	7520-559-9618	CASE, MAINTENANCE AND OPERATIONAL MANUAL		EA	1
PC	2950-045-9611	CASE, RIFLE		EA	1
PC	4210-889-2221	EXTINGUISHER, FIRE		EA	1

By the Order of the Secretary of the Army:

BRUCE PALMER, JR.
General, U. S. Army
Acting Chief of Staff

Official:

VERNE L. BOWERS,
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-38, (qty rqr block No. 333) Operator maintenance requirements for Cranes, Truck Mounted.

TECHNICAL MANUAL
No. 5-3810-207-10

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON 25, D.C., *22 May 1962*

Operator's Manual

CRANE-SHOVEL, BASIC UNIT TRUCK MOUNTED: 20 TON, 3/4 CU YD; GASOLINE DRIVEN, 6X6 (QUICKWAY MODEL M-200) NONWINTERIZED (FSN 3810-542-4982) CRANE SERIAL NUMBERS 20-026 THROUGH 20-500 CARRIER SERIAL NUMBERS 59-026C THROUGH 59-500C; WINTERIZED TO MINUS 65 DEGREES (FSN 3810-542-4980) CRANE SERIAL NUMBERS 20-001 THROUGH 20-025 CARRIER SERIAL NUMBERS 59-001C THROUGH 59-025C

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*This manual supersedes TM 5-3810-207-10, 23 November 1959.

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

a. These instructions are published for the use of the personnel to whom the Quickway Model M-200 Crane-shovel and the M-1200 KW Dart Carrier are issued. They provide information on the operation, lubrication, and preventive maintenance services of the equipment, accessories, components, and attachments.

b. Appendix I contains a list of current references. Appendix II lists the basic issue items authorized for use by the operator. The maintenance allocation chart is published in TM 5-3810-207-20.

c. Numbers in parentheses on illustrations indicate quantity. Numbers preceding nomenclature callouts on illustrations indicate the preferred maintenance sequence.

d. Report all deficiencies in this manual on DA Form 2028. Submit recommendations for changes, additions, or deletions, to Commanding Officer, U. S. Army Engineer Maintenance Center, ATTN: EMCDM-S, P. O. Box 119, Columbus 16, Ohio. Direct communication is authorized.

e. Report unsatisfactory equipment performance and suggestions for equipment improvement to the organizational unit for initiating necessary corrective action.

2. Record and Report Forms

For record and report forms applicable to the operator, refer to TM 38-750.

Note. Applicable forms, excluding standard Form 46 which is carried by the operator, will be kept in a canvas bag mounted on the equipment.

Section II. DESCRIPTION AND DATA

3. Description

a. Crane-shovel. The Quickway Model M-200 Crane-shovel (figs. 1 and 2) is a gasoline engine-driven, 3/4-cubic yard machine, truck mounted, and is designed for use with a crane boom (fig. 3), shovel attachment (fig. 4), clamshell attachment (fig. 5), dragline attachment (fig. 6), back hoe attachment (fig. 7), or piledriver attachment (fig. 8). This crane-shovel is powered by a Continental Model BS-415, 6-cylinder, internal-combustion, gasoline engine. The crane, upon which are mounted the engine, upper machinery, and gantry, revolves around the center pin on rollers. The four rollers on the front and the two rollers on the rear prevent tipping of the crane. In this manual, the terms "left" and "right" are used with respect to the operator's seat. "Front" is the end of the crane to which the boom is installed. "Rear" is the end of the crane which contains the engine and the counterweight. The crane cab is equipped with a gasoline-fired heater that heats the engine and its components and also the crane cab.

b. Carrier. The carrier is a heavy-duty, 6X6 KW Dart, Model M-1200, and is powered by a Continental Model SS-6749, six-cylinder, overhead-valve, internal-combustion engine. The carrier is equipped with power steering, airbrakes, five-speed transmission, two-speed transfer case, and six-wheel drive. A two-shoe manual and air-actuated emergency brake is mounted on the output shaft at the rear of the transfer case. The carrier is equipped with two

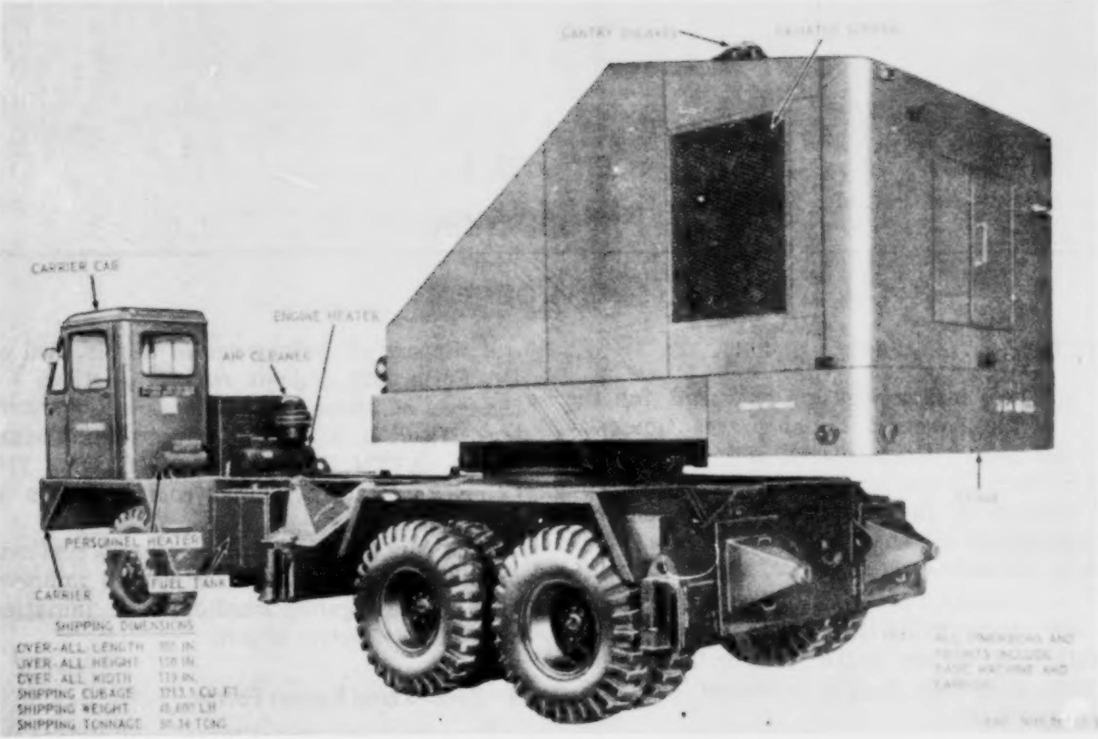


Figure 1. Crane-shovel, left, three-quarter rear view and shipping dimensions.

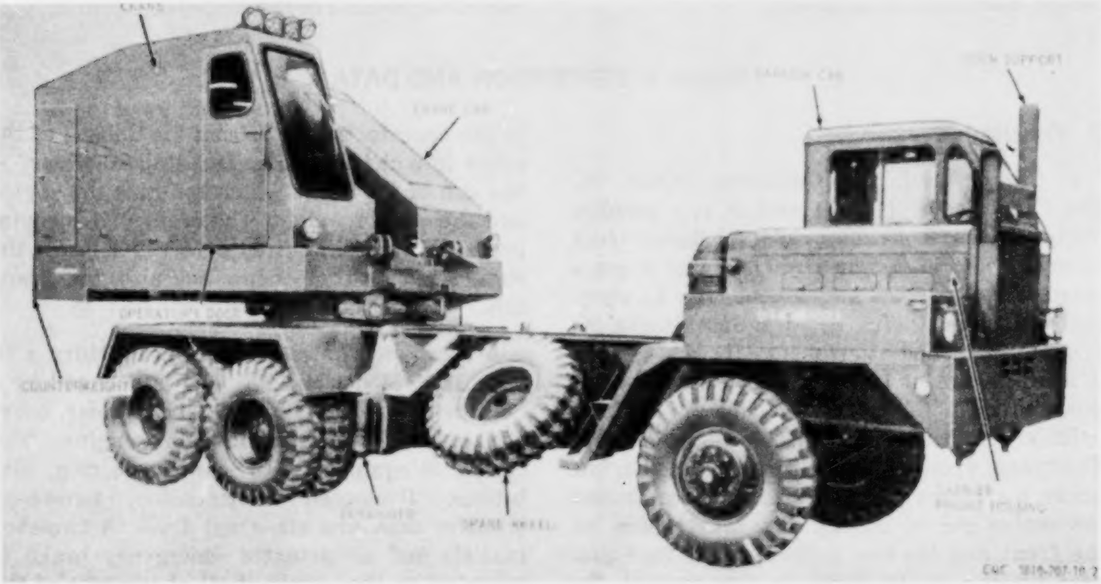


Figure 2. Crane-shovel, right, three-quarter front view.

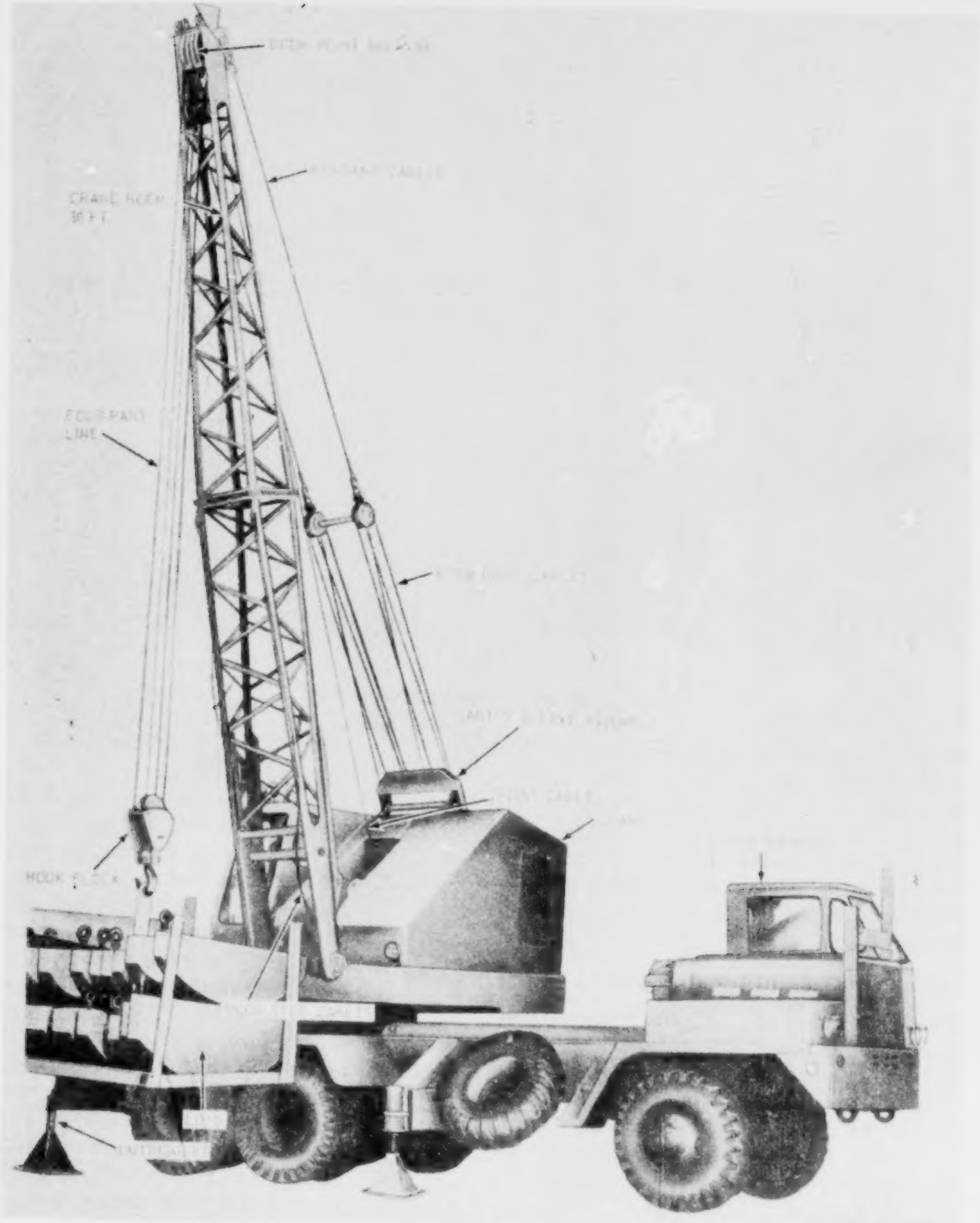


Figure 3. Crane attachments.

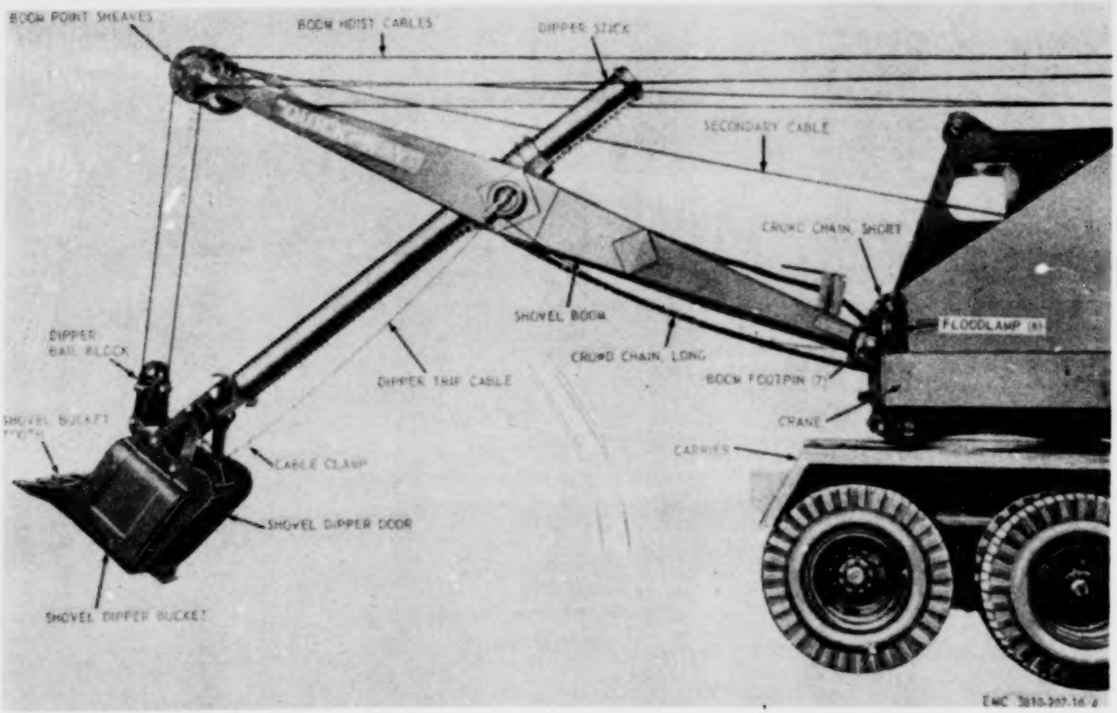


Figure 4. Shovel attachment.

outriggers on each side to improve stability. The engine and the cab are mounted side-by-side on the front of the carrier. Two electric-fired gasoline line heaters are mounted behind the cab. One heats the carrier cab, while the other heats the engine and components. The carrier is equipped to operate under extremely cold conditions.

4. Identification and Tabulated Data

The drain-shovel and carrier have nineteen identification plates.

a. Identification.

(1) *Corps of Engineers carrier identification plate.* This plate is located to the left side of the right-front driving light. It contains the nomenclature for the carrier, make, model, and serial number, and also the make, model, and serial number of the engine.

(2) *Transmission, front axle, and transfer case shifting instruction plate.* This plate is located on the inside of the carrier door. It shows the shifting position of the transmission, front axle, and transfer case levers.

(3) *Transportation instruction plate.* The transportation plate is mounted on the right side of the crane cab. It gives data on the length, height, width, and weight of the crane-shovel and carrier.

(4) *Carrier manufacturer's lubrication instruction plate.* The carrier manufacturer's lubrication instruction plate is located on the inside of the carrier door. It lists the type and grade of lubricant for the carrier at specified temperature ranges from –10° (degrees) F. (Fahrenheit) to 90° F.

(5) *Lifting sling instruction plate.* This plate is located on the rear of the carrier cab under the boom support warning plate. It shows the proper position of the crane-shovel lifting slings

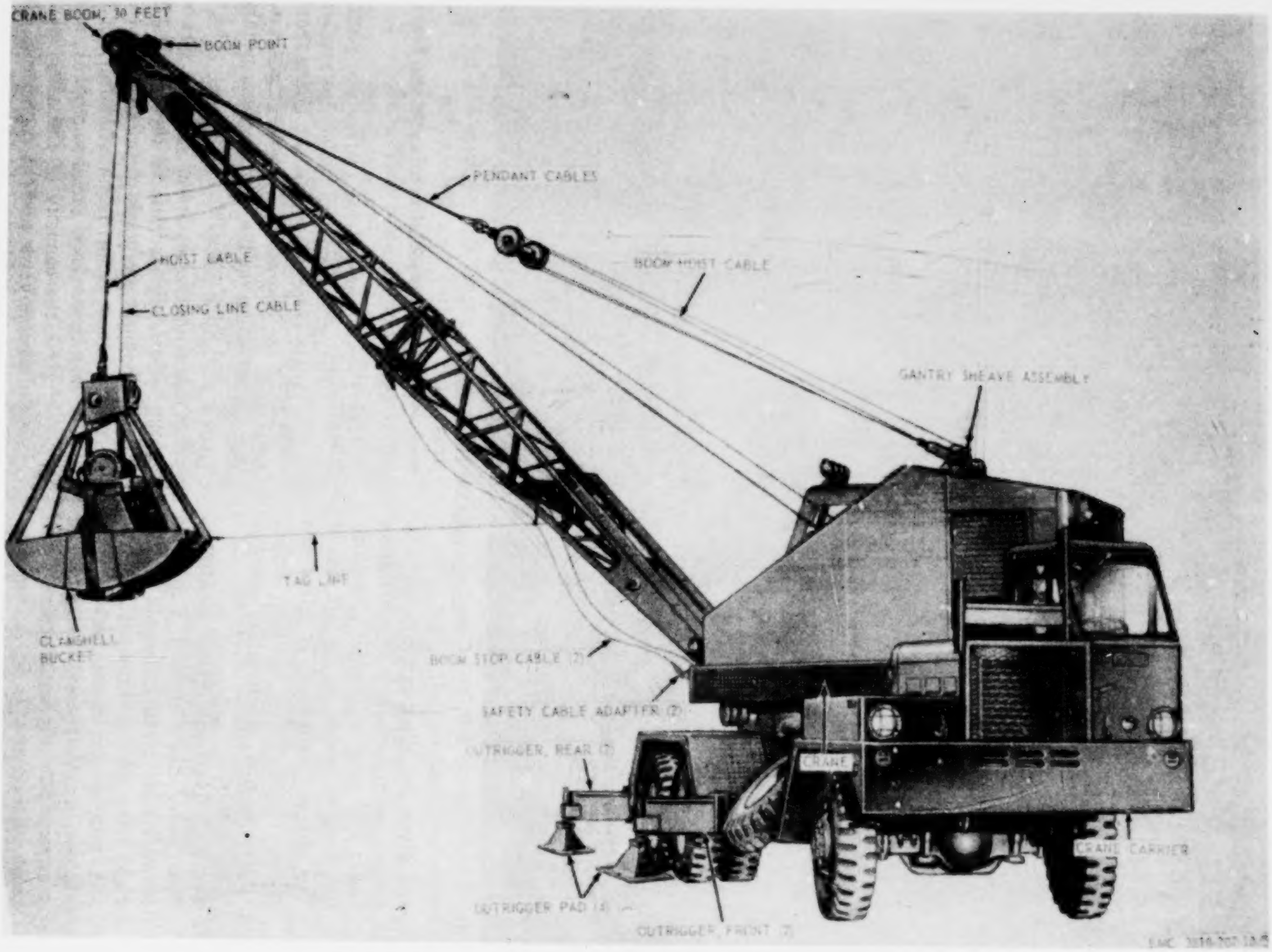


Figure 5. Clamshell attachment.

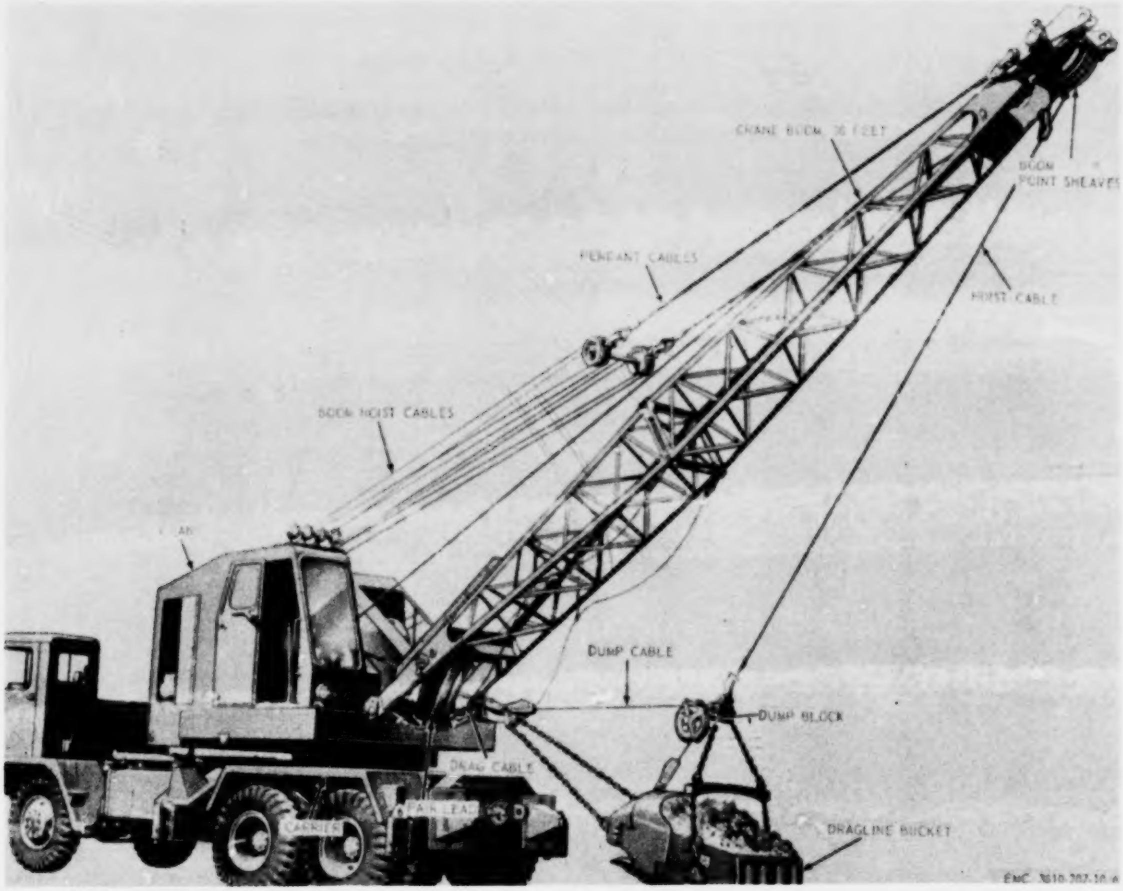


Figure 6. Dragline attachment.

and gives the sling capacity in tons.

(6) *Engine manufacturer's identification plate.* The carrier engine identification plate is located on the left side of the engine crankcase. It gives the manufacturer, motor number, tappet clearance, and specification number of the engine.

(7) *Corps of Engineers crane identification plate.* The Corps of Engineers identification plate is located on the right front of the crane cab. It gives the crane nomenclature, Federal stock number, manufacturer, model, serial number, date of manufacture, contract number, and U. S. A. registration number. It also gives the make, model, and serial number of the crane engine.

(8) *Crane control lever instruction plate.* The crane control lever instruction plate is located on the cab at the front of the operator's controls. It gives instruction on the use of levers, pedals, and other controls.

(9) *Manufacturer's serial number identification plate.* One of these plates is mounted on each front end attachment. It gives the manufacturer, model number, and serial number. It also gives the capacity of the attachment in cubic yards and the capacity of the crane in tons.

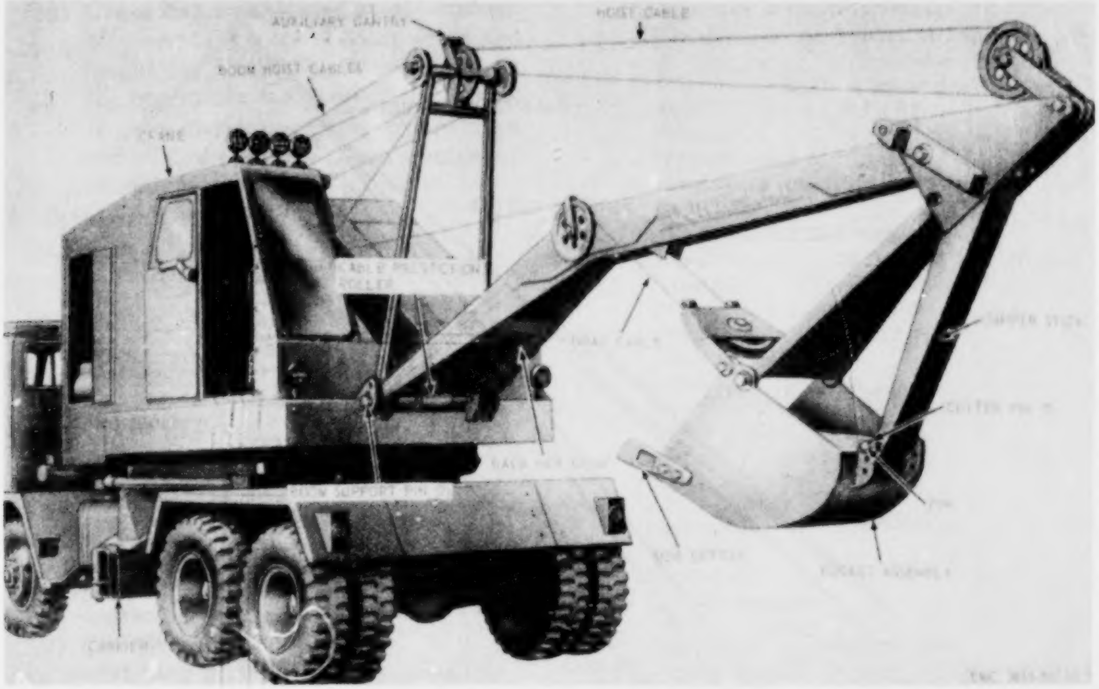


Figure 7. Back hoe attachment.

(10) *Crane lifting capacities instruction plate.* The crane lifting capacities instruction plate is located on the operator's cab door of the crane. It gives the data on the length of boom and radius, with and without outriggers.

(11) *Crane manufacturer's instruction plate.* This plate is located under the guard plate on the right-rear side of the crane. It gives the crane model number and serial number.

(12) *Corps of Engineers shovel front identification plate.* This plate is located near the base of the boom on the left side. It gives the nomenclature, Federal stock number, make, model number, serial number, and date of manufacture. It also gives the make, model number, and Federal stock number of the crane for which the shovel is designed.

(13) *Corps of Engineers fair-lead identification plate.* This plate is mounted on the fair-lead. It gives the nomenclature, military standard number, Federal stock number, contract number, date of manufacturer, and make and model of the crane and boom with which the fair-lead is to be used.

(14) *Corps of Engineers back hoe identification plate.* This plate is located on the left side of the boom. It gives the nomenclature, capacity, Federal stock number, make, model, serial number, date of manufacture, and the nomenclature, model number, and Federal stock number of the crane with which the back hoe is to be used.

(15) *Corps of Engineers jib boom identification plate.* This plate is located on the front of the jib boom. It gives the nomenclature, Federal stock number, contract number, date of manufacture, and the size and type of unit with which the jib boom may be used.

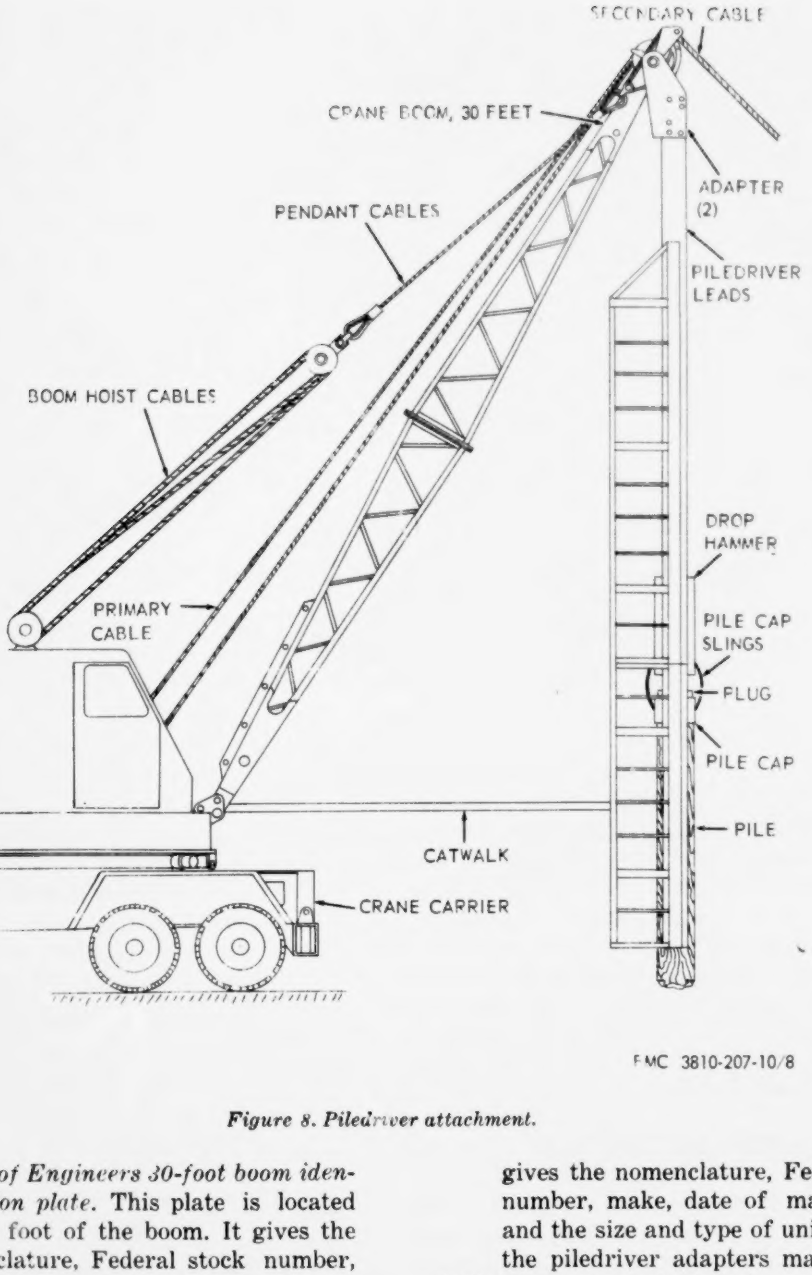


Figure 8. Piledriver attachment.

(16) *Corps of Engineers 30-foot boom identification plate.* This plate is located on the foot of the boom. It gives the nomenclature, Federal stock number, contract number, date of manufacture, and the size and type of unit with which the boom may be used.

(17) *Corps of Engineers piledriver adapters identification plate.* This plate is located on the side of one adapter. It gives the nomenclature, Federal stock number, make, date of manufacture, and the size and type of unit on which the piledriver adapters may be used.

(18) *Engine manufacturer's crane identification plate.* This plate is located on the left side of the engine crankcase. It gives the make and model, serial, and specification numbers of the engine.

(19) *Crane boom angle and height instruction plate.* The crane boom angle and height instruction plate is located on the operator's cab door of the crane. It gives the data on the crane boom and distance in feet from center of rotation.

b. Tabulated Data.

(1) *Crane.*

Manufacturer	Quick Way Truck Shovel Company
Model	M–200
Engine	Gasoline
Manufacturer	Continental Motors Corporation
Model number	BS–415
Horsepower	110 at 1,800 rpm (revolutions per minute)
Number of cylinders.	6
Firing order	1–5–3–6–2–4
Governed sped	1,800 rpm
Electrical system.	24 volts

(2) *Crane engine heater.*

Manufacturer	Perfection Industries, Division of Hupp Corporation
Model	E510A
Volts	24
Type of control	Remote
Temperature selection.	Manual

(3) *Carrier.*

Manufacturer	KW Dart Truck Company
Model number	M–1200
Engine	Gasoline
Manufacturer	Continental Motors Corp.
Model number	SS6749
Number of cylinders.	6
Firing order	1–5–3–6–2–4
Governed speed	2,600 rpm
Electrical system.	24 volts
Tire pressure (normal)	80 psi (pounds per square inch)
Sandy areas	72 psi

(4) *Carrier engine heater.*

Manufacturer	Perfection Industries, Division of Hupp Corporation
Model	E510A
Volts	24
Type of control	Remote
Temperature selection.	Manual

(5) *Carrier personnel heater.*

Manufacturer	Perfection Industries, Division of Hupp Corporation
Model	MH15B2
Volts	24
Type of control	Remote
Temperature selection.	Thermostatic

(6) *Dimensions and weights.*

Overall length (carrier).	25 ft (feet) 5 in. (inches)
Overall width	9 ft 11 in.
Overall width (outriggers out).	16 ft 9 in.
Overall height	12 ft 6 in.
Carrier frame height. (top of frame-to-ground).	51–1/2 in.
Carrier cab length.	4 ft 9–1/2 in.
Carrier cab width (outside.	2 ft 9 in.
Carrier cab width (inside).	2 ft 5–1/2 in.
Carrier cab height.	4 ft 9 in.
Carrier wheel base.	14 ft 7 in.
Length between center of tandem axles.	4 ft 2 in.
Carrier turning radius.	47 ft
Crane-shovel overall length (less boom)	28 ft
Crane overall length (w/30 boom).	43 ft 5 in.
Crane overall length (w/40 ft boom).	53 ft 10 in.
Crane overall length (w/ shovel boom).	36 ft 4 in.
Crane overall length (w/ backhoe).	37 ft 6 in.
Crane overall length jib boom (w/30 ft boom).	58 ft 5 in.
Crane overall length jib boom (w/40 ft boom).	68 ft 5 in.

Shipping cubage (carrier and crane).	3213.5 cu ft (cubic feet)
Crane cab length	12 ft 10 in.
Crane cab width	8 ft
Crane cab height	7 ft 9-1/2 in.
Crane cab height (above ground).	12 ft 6 in.
Shipping weight (crane and carrier).	48,600 lb (pounds)
Weight with 30 ft boom.	50,900 lb
Carrier weight	24,700 lb
Crane weight	23,900 lb
Crane boom length.	30 ft
Boom extension length.	10 ft
Jib boom length	15 ft
Hook block:	
Height	46-7/16 in.
Width	17 in.
Thickness	10-1/2 in.
Weight	440 lb
Capacity	20 tons
Clamshell bucket:	
Length	6 ft 3 in.
Width	3 ft
Height	7 ft 6 in.
Weight	3,230 lb
Number of teeth.	6
Dragline bucket:	
Length	5 ft 7 in.
Width	4 ft. 3 in.
Height	4 ft 6 in.
Weight	2 150 lb
Back hoe bucket:	
Height	3 ft 6 in.
Width	3 ft 4 in.
Length	5 ft 5 in.
Weight	1.378 lb
Piledriver:	
Lead:	
Length	30 ft and 20 ft
Width. between guide jaws	1 ft 1 in. and 1 ft 9 in.
Width overall.	2 ft 9-3/16 in. and 2 ft 9-3/16 in.
Weight	1.750 lb and 1.150 lb
Catwalk:	
Sections	two—8 ft and one—7 ft 8 in.
Extended length (w/overlap).	23 ft
Contracted length.	8 ft
Width	2 ft 1 in.
Weight	1,265 lb
Hammer:	
Weight	3,000 lb
Jaw width	8-1/4 in.
Width between jaws.	21 in.

(7) *Capacities (crane-shovel).*

Engine crankcase	8 qt (quart) (s)
Engine oil filter (2).	1 qt (each)
Engine air cleaner.	1 qt
Hydraulic system.	7 qt
Fuel tank	50 gal (gallons)
Radiator	34 qt
Main drive chain case.	2-1/2 qt
Boom hoist gearcase.	1 qt

(8) *Capacities (carrier).*

Engine crankcase.	18 qt
Engine oil filter (2)	1 qt (each)
Engine air cleaner.	2-1/4 qt
Fuel tank	72 gal
Radiator	54 qt
Transmission	12 qt
Transfer case	2-1/2 qt
Front axle	11 qt
Rear axle (2)	11 qt (each)
Hydraulic steering tank.	1 gal
Steering gearbox.	1 qt

(9) *Cable specifications.*

Crane boom, standard 30 foot:	
Boom hoist cable.	9/16 in. dia (diameter), 6 x 19 right regular lay, 198 ft lg (long)
Primary hoist cable.	5/8 in. dia, 6 x 19 right regular lay, 170 ft lg
Secondary hoist cable.	5/8 in. dia, 6 x 19 left regular lay, 230 ft lg

Note. For each additional 10 feet of boom, add 20 feet to hoist and drag cable lengths. Add pendant cables as required for various lengths of extensions.

Jib boom, 15 foot.	
Upper support cable.	5/8 in. dia, 6 x 19 right regular lay, 35 ft lg
Lower support cable.	5/8 in. dia, 6 x 19 right regular lay, 56 ft lg
Shovel and dipper trip assembly:	
Shovel boom cable.	9/16 in. dia, 6 x 19 right regular lay, 198 ft lg

Hoist cable	5/8 in. dia, 6 x 19 left regular lay, 75 ft lg
Power trip actuating cable.	1/8 in. dia, 7 x 19 corrosion resistant steel, 9 ft lg
Power trip cable (trip-to-boom drum).	5/16 in. dia, 6 x 37 right regular lay, 13 ft 2 in. lg
Power trip cable (boom drum-to-dipper).	5/16 in. dia, 6 x 37 right regular lay, 14 ft 7 in. lg
Clamshell boom, standard 30 foot	
Boom hoist cable.	9/16 in. dia, 6 x 19 right regular lay, 198 ft lg
Hoist cable	5/8 in. dia, 6 x 19 left regular lay, 95 ft lg
Closing cable	5/8 in. dia, 6 x 19 right regular lay, 120 ft lg
Tag line cable	3/8 in. dia, 8 x 19 right regular lay, 60 ft lg
Dragline boom standard 30 foot:	
Boom hoist cable.	9/16 in. dia, 6 x 19 right regular lay, 198 ft lg
Hoist cable	5/8 in. dia, 6 x 19 left regular lay, 145 ft lg
Drag cable	5/8 in. dia, 6 x 19 right regular lay, 75 ft lg
Dump cable	5/8 in. dia, 6 x 19 right regular lay, 13 ft lg
Back hoe:	
Gantry frame cable.	9/16 in. dia, 6 x 19 right regular lay, 90 ft lg
Hoist cable	5/8 in. dia, 6 x 19 left regular lay, 83 ft lg
Drag (pull) cable.	5/8 in. dia, 6 x 19 right regular lay, 75 ft lg
Piledriver boom, standard 30 foot:	
Boom hoist cable.	9/16 in. dia, 6 x 19 right regular lay, 198 ft lg
Hammer	5/8 in. dia, 6 x 19 left regular lay, 95 ft lg
Pile hook cable.	5/8 in. dia, 6 x 19 right regular lay, 85 ft lg

(10) *Crane lifting capacities.* Crane lifting capacities are listed in table I. Eighty-five percent of tipping rated loads shown are gross hook loads measured from the center of rotation and include the weight of the bucket and any other external auxiliary lifting means. Ratings are based on crane standing on a firm and level supporting surface. Deduct 200 pounds for each additional 5 feet of boom extension.

Table I. Crane Lifting Capacities

Maximum capacity on crane boom with outriggers

Radius	Boom length			
	30 ft	35 ft	40 ft	45 ft
10	40,000 lb	40,000 lb	----	----
15	38,000 lb	37,875 lb	37,700 lb	37,625 lb
20	22,750 lb	22,625 lb	22,500 lb	22,375 lb
25	15,900 lb	15,775 lb	15,650 lb	15,325 lb
30	12,000 lb	12,000 lb	12,000 lb	11,875 lb
35	---	9,575 lb	9,450 lb	9,325 lb
40	---	----	7,650 lb	7,525 lb
45	---	----	---	6,375 lb

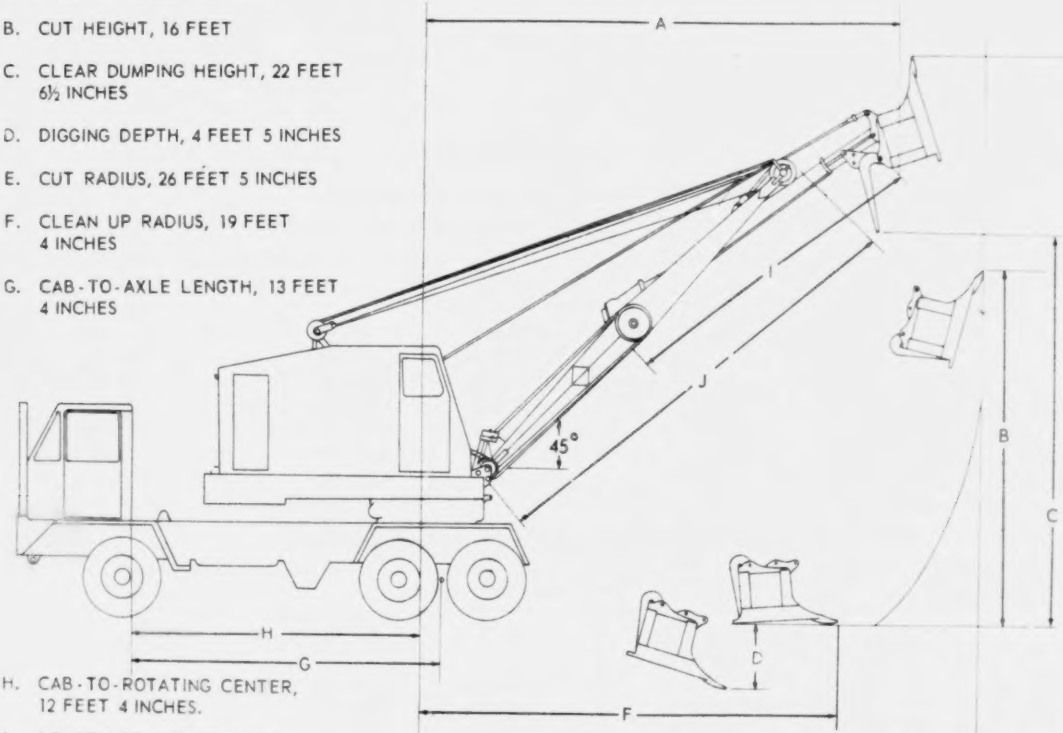
Maximum capacity on crane boom without outriggers

Radius	Boom length			
	30 ft	35 ft	40 ft	45 ft
10	24,000 lb	24,000 lb	---	---
15	14,450 lb	14,325 lb	14,200 lb	14,075 lb
20	9,700 lb	9,575 lb	9,450 lb	9,325 lb
25	7,150 lb	7,025 lb	6,900 lb	6,775 lb
30	5,500 lb	5,375 lb	5,250 lb	5,125 lb
35	----	4,325 lb	4,200 lb	4,075 lb
40	----	---	3,400 lb	3,275 lb
45	----	---	---	2,675 lb

(11) Crane boom angle and height data. The boom angle, height from ground, and distance from center of rotation are listed in table II.

Table II. Crane Boom Angle and Height Data

Boom length in feet	Angle in degrees	Height above ground	Distance from center of rotation
30	5	8.5 ft	33.5 ft
30	10	11.3 ft	33.2 ft
30	15	13.8 ft	32.8 ft
30	20	16.2 ft	31 ft
30	25	18.8 ft	30 ft
30	30	21 ft	28.5 ft
30	35	23 ft	27.2 ft
30	40	25.5 ft	25.5 ft
30	45	27 ft	24 ft
30	50	29 ft	22 ft
30	55	30.7 ft	20 ft
30	60	32 ft	17.8 ft
30	65	33 ft	15.4 ft
30	70	34 ft	13 ft
30	75	35 ft	10.5 ft
30	80	35.5 ft	8 ft
40	5	9.5 ft	42.5 ft
40	10	13 ft	42 ft
40	15	16.5 ft	41.4 ft
40	20	19.8 ft	40.3 ft
40	25	23 ft	39 ft
40	30	26 ft	37.5 ft
40	35	29 ft	35.5 ft
40	40	31.8 ft	33.3 ft
40	45	34 ft	31 ft
40	50	36.5 ft	28.3 ft
40	55	38.8 ft	25.8 ft
40	60	40.8 ft	22.8 ft
40	65	42.2 ft	19.7 ft
40	70	43.7 ft	16.3 ft
40	75	44.8 ft	13 ft
40	80	45.4 ft	9.8 ft



A. DUMPING RADIUS, 22 FEET

B. CUT HEIGHT, 16 FEET

C. CLEAR DUMPING HEIGHT, 22 FEET 6½ INCHES

D. DIGGING DEPTH, 4 FEET 5 INCHES

E. CUT RADIUS, 26 FEET 5 INCHES

F. CLEAN UP RADIUS, 19 FEET 4 INCHES

G. CAB-TO-AXLE LENGTH, 13 FEET 4 INCHES

H. CAB-TO-ROTATING CENTER, 12 FEET 4 INCHES.

I. LENGTH OF DIPPER STICK, 12 FEET 8 INCHES

J. LENGTH OF SHOVEL BOOM, 18 FEET

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Figure 9. Shovel operating ranges.

(12) *Shovel operating ranges and general dimensions.* These operating ranges (fig. 9) are given with the boom at a 45° angle.

(13) *Back hoe operating ranges.* These operating ranges (fig. 10) are given with the boom at a 45° angle.

(14) *Dragline operating ranges.* These operating ranges are given for 30 and 35 foot booms with the boom at 30, 35, 40, and 45° angles as shown in figure 11 and table III.

(15) *Clamshell operating ranges.* The operating ranges of the clamshell are relative to angle and dimensions as the dragline. Refer to table III for degree angles and (par. 30) for clamshell operation.

Table III. Dragline Operating Ranges

		30 foot boom			
A	Boom Length				
B	Boom Angle	30°	35°	40°	45°
		ft in.	ft in.	ft in.	ft in.
C	Dumping radius	30 8	29 4	27 9	26 1
D	Dumping height	12 0	14 3	16 4	18 4
E	Digging radius[a]				
F	Boom peak radius	29 5	28 4	26 6	24 9
G	Boom peak height	21 10	23 11	25 11	27 9
H	Depth of cut	12 0	11 0	10 0	8 9
I	Bucket dumping height[b].				

		35 foot boom			
A	Boom length	30°	35°	40°	45°
B	Boom angle	ft in.	ft in.	ft in.	ft in.
C	Dumping radius	35 0	33 6	31 8	29 8
D	Dumping height	14 6	17 1	19 7	21 11
E	Digging radius[a]				
F	Boom peak radius	33 9	32 2	30 4	28 4
G	Boom peak height	24 4	26 9	29 2	31 4
H	Depth of cut	15 0	13 11	12 8	11 3
I	Bucket dumping height[b].				

[a] Digging radius E equals peak radius F plus 1/2 to 1/3 dumping height D depending on operator's skill in casting the bucket.

[b] "I" (approx) 3/4 yard bucket 10 ft 4 in.

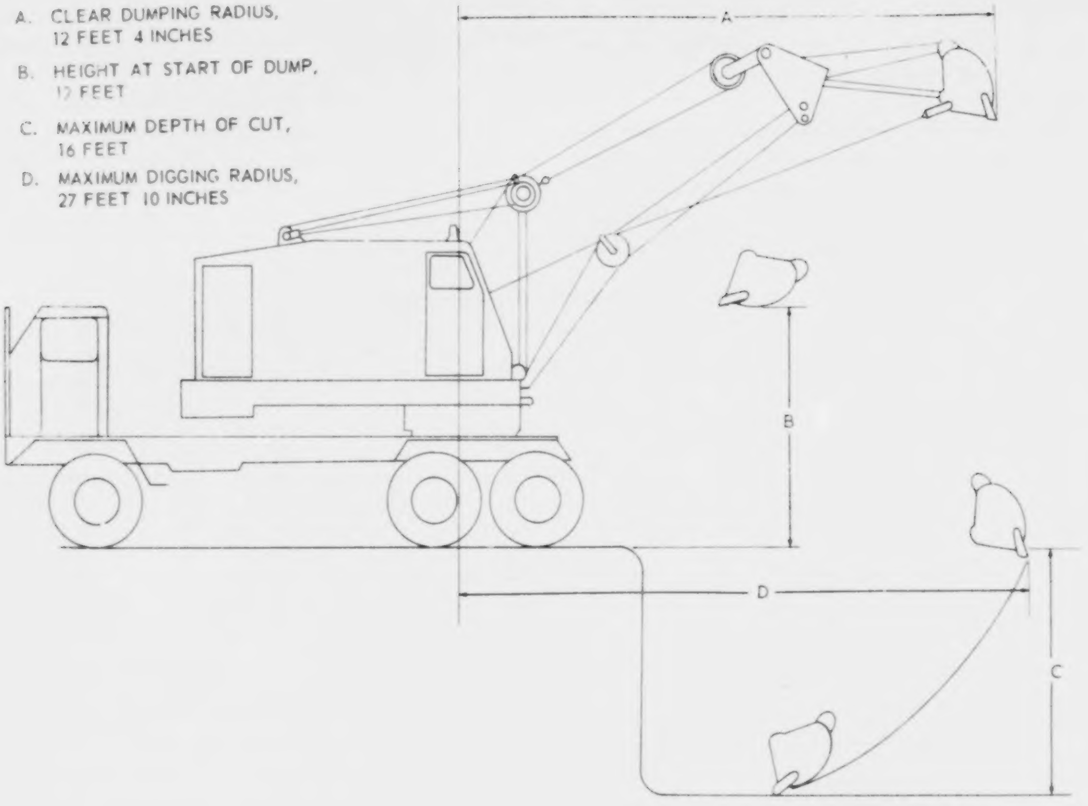
A. CLEAR DUMPING RADIUS, 12 FEET 4 INCHES
B. HEIGHT AT START OF DUMP, 12 FEET
C. MAXIMUM DEPTH OF CUT, 16 FEET
D. MAXIMUM DIGGING RADIUS, 27 FEET 10 INCHES
A
B
C
D

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Figure 10. Back hoe operating ranges.

c. General Data. Listed below are the weights of materials per 3/4 cubic yard, in pounds, commonly handled with the clamshell, dragline, shovel, and back hoe. These weights are approximate and should be used only as a general guide. Be sure to add the weight of the bucket to determine the total load on clamshell and dragline operation. For materials not listed here, refer to FM 5-35.

Ash, dry	700 lb
Cinders	1,000-1,200 lb
Clay, compact	2,900 lb
Clay, dry lumps	1,700 lb
Coal, anthracite	1,200-1,500 lb
Coal, bituminous	1,000-1,450 lb
Coke	2,000 lb
Concrete, ready-to-pour	3,000 lb
Earth, dry, loose	2,000 lb
Earth, dry, packed	2,500 lb
Earth, mud, packed	3,000 lb
Gravel, loose, dry	2,400-2,800 lb
Gravel, wet, packed	2,700-3,200 lb
Gypsum, crushed	1,900 lb
Iron ore (50% iron)	4,300-4,800 lb
Limestone, 1-1/2 to 2 in. grade.	4,450 lb
Limestone, run-of-crusher.	2,000 lb
Sand, dry, loose	2,400 to 2,800 lb
Sand, wet, packed	3,200 lb

d. Maintenance and Operating Supplies. Supplies required for maintenance and operation of the crane and carrier are listed in Table IV.

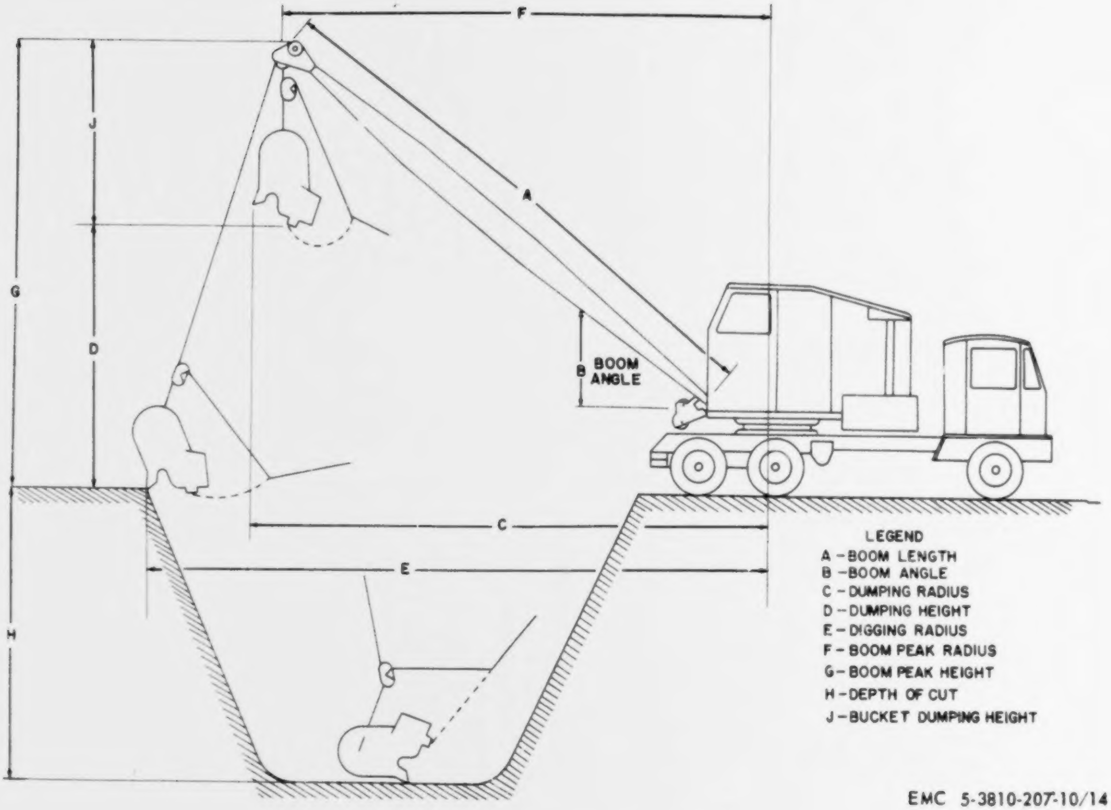


Figure 11. Dragline operating ranges

Table IV. Maintenance and Operating Supplies

Item	Component application	Source of supply	Federal stock No.	Description	Quantity required for initial operation	Quantity required for 8 hours operation	Notes
1.	0101 CRANKCASE(1)			OIL, LUBRICATING: 5-gal drums as follows:	----------	----------	(1) Includes quantity of oil to fill engine oil system as follows: Crane Engine: Crankcase ______ 8 qt Oil Filter ______ 2 qt Oil Cooler ______ 1 qt Carrier Engine: Crankcase ___ 18 qt Oil Filter ______ 2 qt
		10	9150-265-9428(2)	OE-10	(1)	(3)	
		10	9150-265-9435(2)	OE-30	(1)	(3)	
		10	9150-242-7603(2)	OES	(1)	(3)	
2.	0304 AIR CLEANER(2)			OIL, LUBRICATING:	(4)	(3)	
3.	0306 FUEL TANK			GASOLINE, AUTOMOTIVE: bulk as follows:	(6)	(7)	(2) See SM10-1-C4-1 for additional data and requisitioning procedure.
		10	9130-760-1818(2)	91A.			
4.	0501 RADIATOR			WATER	(8)		
				ANTIFREEZE: 55-gal drum as follows:			(3) See LO 5-3810-207-20 for grade application and replenishment intervals.
		9	6850-243-1990	ANTIFREEZE: Ethylene glycol inhibited	(8)	(8)	
		9	6850-174-1806	ANTIFREEZE: arctic	(8)	(8)	(4) Air cleaner capacities are as follows: Crane ________ 1 qt Carrier ______ 2-1/4 qt
5.	0700 TRANSMISSION			OIL, LUBRICATING, GEAR: 5-gal drums as follows:			
		10	9150-577-5844(2)	GO-90	12 qt	(3)	(5) Use oil as prescribed in item 1 above.
		10	9150-257-5440(2)	GOS	12 qt	(3)	
6.	0800 TRANSFER CASE (9)			OIL, LUBRICATING, GEAR	2-1/2 qt	(3)	(6) Fuel tank capacities are as follows: Crane __________ 50 gal Carrier ________ 72 gal
7.	1002 FRONT DIFFERENTIAL (9)	--	----------------	OIL, LUBRICATING, GEAR	11 qt	(3)	(7) Average fuel consumption per hour of continuous operation is as follows: Crane _______ 7.6 gal Carrier ______ 13.6 gal
8.	1102 REAR DIFFERENTIAL (9)	--	----------------	OIL, LUBRICATING	11 qt ea.	(3)	(8) See TM 5-3810-207-20 for ambient temperatures, specific gravity and replenishment data.

Item	Component application	Source of supply	Federal stock No.	Description	Quantity required for initial operation	Quantity required for 8 hours operation	Notes
9.	1300 WHEELS	--	----------------	GREASE, AUTOMOTIVE AND ARTILLERY:			Cooling system capacities are as follows: Crane ---------- 34 qt Carrier -------- 54 qt (9) Use oil as prescribed in item 5 above.
		10	9150-190-0905(2)	5 lb can as follows: GAA	3 lb	(3)	
10.	1401 STEERING GEAR ASSEMBLY (9)			OIL, LUBRICATING, GEAR	1 qt	(3)	(10) Fuel for heater is drawn from the main tanks.
11.	1413 TANK, HYDRAULIC BOOSTER	--	----------------	HYDRAULIC FLUID, PETROLEUM BASE:			(11) Heater fuel consumption per hour of continuous operation is as follows: Carrier personnel-- .27 gal Carrier engine -- .75 gal Crane engine -- .75 gal
		10	9150-233-4134(2)	1-gal can a follows: OHA	(4) qt	(3)	
12.	4305 HYDRAULIC CYLINDERS	--	----------------	HYDRAULIC FLUID, NONPETROLEUM BASE, AUTOMOTIVE			
		10	9150-252-6375(2)	1-gal can as follows: MBA	7 qt	(3)	(12) Use grease as prescribed in item 9 above.
13.	6000.1 PERSONNEL HEATERS	--	----------------	GASOLINE, AUTOMOTIVE.	(10)	(11)	
14.	6000.3 ENGINE HEATERS	--	----------------	GASOLINE, AUTOMOTIVE.	(10)	(11)	
15.	7401.3 TAGLINE (5)	--	----------------	OIL, LUBRICATING	8 qt	(3)	
16.	7406.12 MAIN DRIVE CHAIN CASE (9)	--	----------------	OIL, LUBRICATING, GEAR.	3-1/2 qt	(3)	
17.	7406.12 BOOM HOIST GEAR CASE (9)	--	----------------	OIL, LUBRICATING, GEAR.	1 qt	(3)	
18.	OIL CAN POINTS (5)	--	----------------	OIL, LUBRICATING	1/2 qt	(3)	
19.	GREASE GUN POINTS (12)	--	----------------	GREASE. AUTOMOTIVE AND ARTILLERY.	5 lb	(3)	
20.	EXPOSED GEARS	--	----------------	OIL, LUBRICATING, CHAIN-WIRE ROPE-EXPOSED GEARS:			
		10	9150-234-5199(2)	5-lb cans as follows: CW-11B	2 lb	(3)	

5. Difference in Models

a. This manual covers the Quickway Model M–200 Crane mounted on the KW Dart Model M–1200 Carrier, winterized to minus 65°F. Twenty-five units are winterized to minus 65° F., crane serial numbers 20–001 through 20–025, carrier serial numbers 59–001C through 59–025C, FSN 3810–542–4980. Four hundred and seventy-five units are nonwinterized, crane serial numbers 20–026 through 20–500, carrier serial numbers 59–026C through 59–500C, FSN 3810–542–4982. Grease fittings are provided to lubricate the crane house lockshaft on cranes with serial numbers 20–001 through 20–263. Grease fittings are provided on the crane-carrier-clutch cross-shaft and transfer case shift levers for cranes with serial numbers 20–001 through 20–299. The carrier gas tank sending unit is protected by a guard for cranes with serial numbers 20–001 through 20–149 and numbers 20–151.

b. MWO Modifications—TM 5–3810–207–35/1

(1) To install a new gas tank underneath machinery deck for the crane—Serial number range: on as-needed basis.

(2) To install grease fittings for lubrication of crane house lockshafts—Serial number range: 20–001 through 20–263.

(3) To install grease fittings for lubrication of clutch cross-shaft on crane carriers—Serial number range: 20–001 through 20–299.

(4) To provide lubrication on crane carrier transfer case shift lever—Serial number range: 20–001 through 20–299.

(5) To install a guard over the sending unit on the carrier gas tank—Serial number range: 20–001 through 20–149, and 20–151.

CHAPTER 2

INSTALLATION AND OPERATION INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

6. Unloading Equipment

a. General. The operator of the crane-shovel may assist in unloading the equipment from the flatcar or common carrier. The operator will help in the removal of tiedown cables, strapping, blocking, and the like, securing the equipment. The operator shall drive the crane-shovel down the ramp when hoisting equipment is not available.

b. Driving the Crane-Shovel off Flatcar.

(1) Service the batteries (par. 7).

(2) Remove all tape and covers from windows before driving carrier.

(3) Start the carrier engine (par. 25).

(4) Drive the carrier off the flatcar and down the ramp.

***Caution:* Move the crane-shovel down the ramp slowly so it will be under control at all times.**

c. Unloading Crane-Shovel by Towing.

(1) Remove all blocking and tiedown cables.

(2) Hook a suitable towing device to the carrier.

(3) Hook a cable to the rear of the carrier and to another vehicle, to retard the carrier going down the ramp.

(4) Release the emergency brake and position the gearshift lever in the neutral position.

(5) Steer the carrier down the middle of the ramp. Use the emergency brake lever as necessary.

***Caution:* Move the carrier slowly so it will be under control at all times.**

d. Unloading Crane-shovel by Lifting. When using a lifting device to remove the crane-shovel from the flatcar, be sure that the lifting device is of adequate lifting capacity. Use slings of the proper length and capacity with spreaders when unloading by crane.

***Caution:* Be sure the lifting device has a capacity of 30 tons or over.**

7. Inspecting and Servicing Equipment

a. Perform the before-operation services listed in paragraph 54.

b. Make a complete visual inspection to see that the required tools, repair parts, publications, accessories, and attachments are on or with the crane-shovel.

c. Visually inspect the entire crane-shovel for loss of parts or damage which may have occurred during loading, removal, or shipment.

d. Inspect all controls and instruments for damage and improper operation. Inspect the instruments and gages for broken glass or illegibility.

e. Check the electrical system wiring to see that all visible terminals are properly connected.

f. Inspect each component of the crane-shovel for proper mounting and good connections with other components and controls.

g. Check each item of accessory equipment and tools against the basic issue items list in appendix II. Report any deficiencies or shortages to organizational maintenance.

h. Inspect the tires for cuts or damage and proper inflation.

i. Inspect the cooling system, batteries, hydraulic system, and lubricants. Perform all operator's daily services (par. 54).

j. Remove all dirt, grease, preservatives, and foreign matter from the carrier and crane engines with an approved cleaning solvent.

k. Lubricate the crane-shovel as specified in the current lubrication order (LO 5-3810-207-20).

l. Fill the fuel tank—take every precaution to keep dirt, water, or other foreign matter out of the fuel tank during the filling operation.

m. Service the radiator (pars. 118 and 120).

n. Check the hydraulic fluid levels in the operating control system of the crane and the hydraulic steering system of the carrier. Replenish as necessary (LO 5-3810-207-20).

o. Inspect battery lugs for proper adjustment and tightness on battery post.

p. Using distilled water, service the batteries as instructed in figure 12.

Note. If the batteries are received dry, report this condition to organizational maintenance.

q. Be sure the fire extinguishers are mounted properly, fully charged, and in operating condition (pars. 46-48).

8. Installation or Setting-Up Instructions

a. Positioning the carrier. The carrier should be positioned so as to afford the crane operator the best and safest working angle and the firmest support for the unit regardless of type of work to be done.

b. Positioning the Outriggers. Position the front and rear outriggers (fig. 13).

9. Converting Machine for Shovel Operation

a. General. Equipment required for shovel operation includes shovel boom assembly with bucket, dipper trip cable, crowd chains, sprockets, cables, and crowd and retract mechanism on the revolving frame, drum sprocket and cables, and saddle block. The dipper is attached to the end of the dipper handle, which slides through the saddle block located near the center of the boom. Adequate tools and organizational maintenance personnel will be needed to install shovel attachments.

b. Rear Outrigger Removal. Remove the carrier rear outrigger assembly before operating the shovel (fig. 36).

c. Installation of Boom.

(1) With the crane facing toward the rear of the carrier, back the unit into position, alining the upper main frame holes of the crane with the shovel boom foot.

(2) Remove the two boom footpins from the mounting holes in the upper main frame boom support (fig. 14).

(3) Using a suitable lifting device, lift the boom in position, and aline the holes in the shovel boom foot with the holes in the main frame supports on the crane deck.

(4) Install the shovel boom (fig. 14).

(5) Remove the primary drum lagging and install the split crowd sprocket lagging halves on the primary drum (fig. 15).

(6) Install the intermediate crowd and retract sprocket assembly on the crane revolving frame (fig. 16).

(7) Position the short crowd chain around the split crowd sprocket, over the chain adjusting sprocket, and around the intermediate crowd and retract sprocket. Connect the chain with the link pin and link lockpin. Adjust the short crowd chain (*e* below).

(8) Position the long crowd chain (fig. 14) over the boom idler adjustment sprocket, around the large intermediate sprocket (fig. 16) and the chain drive sprocket on the shipper shaft. Connect the chain (fig. 14) with the link and link lockpin. Adjust the long crowd chain (*f* below).

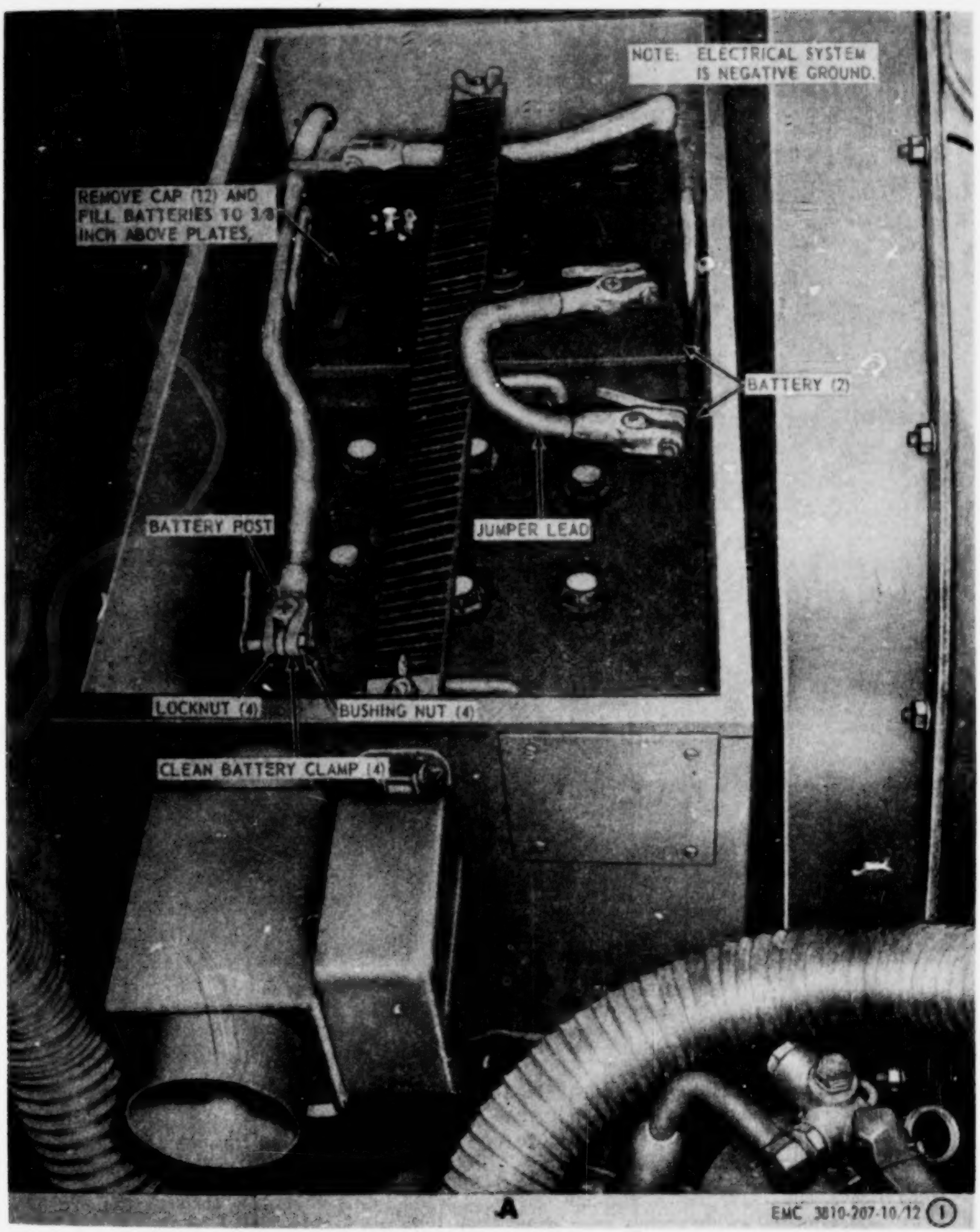
(9) Position the dipper trip lever on the swing clutch lever and install the pin and cotter pin (fig. 17).

(10) Install the guide pulley on the swing clutch lever.

(11) Install the trip mechanism to the floorplate below the left swing shaft (fig. 18).

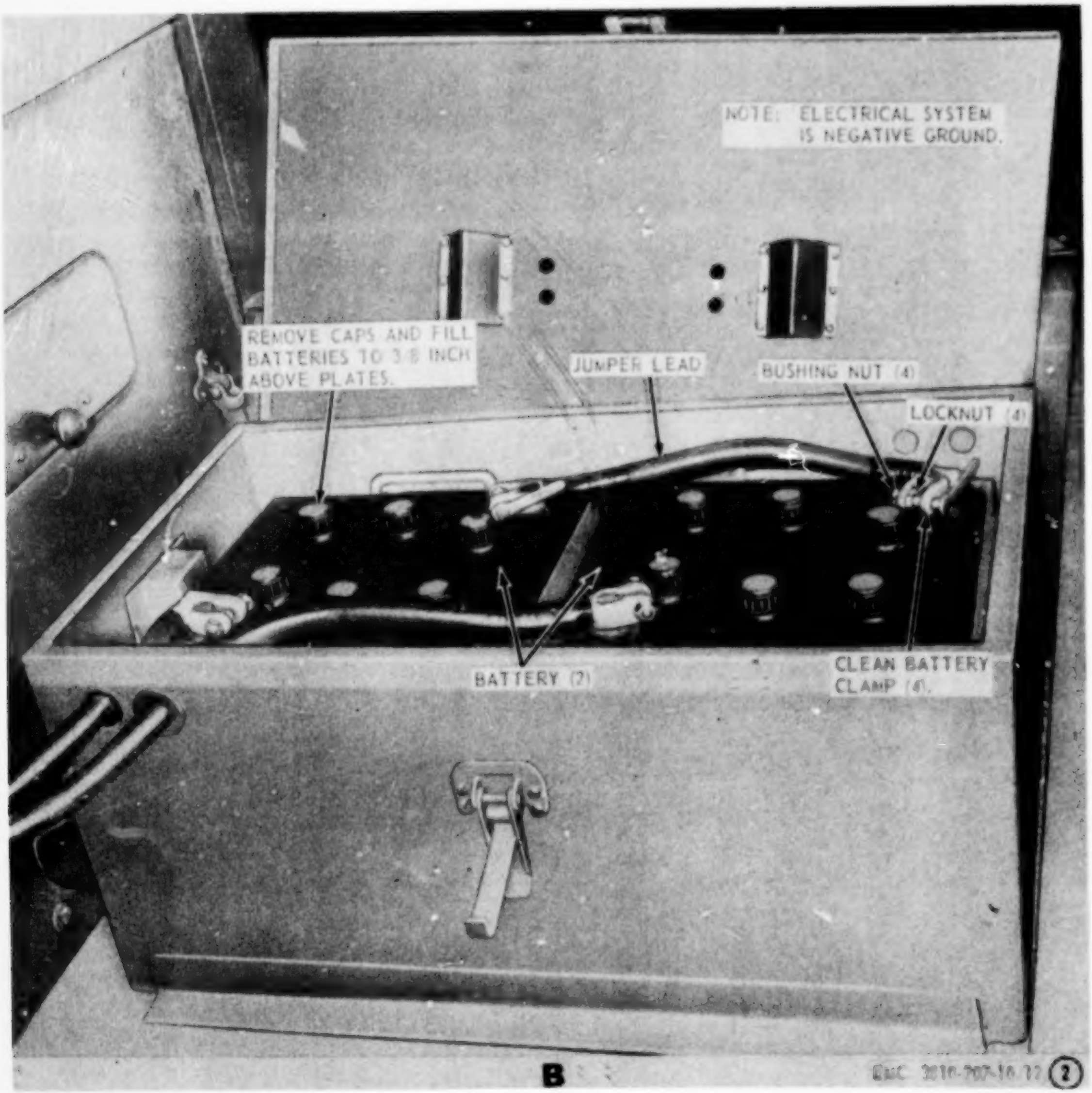
(12) Install the trip cam assembly on the swing shaft.

(13) Install the trip actuator cable guide on the left side floorplate.



A. Carrier batteries, installed view

Figure 12. Battery service.


NOTE: ELECTRICAL SYSTEM IS NEGATIVE GROUND.
REMOVE CAPS AND FILL BATTERIES TO 3/8 INCH ABOVE PLATES.
JUMPER LEAD
BUSHING NUT (4)
LOCKNUT (4)
BATTERY (2)
CLEAN BATTERY CLAMP (4).
B
EMC 3810-207-10/12 ②

B. Crane battteries, installed view

Figure 12—Continued.

(14) Insert one end of the actuator cable (fig. 17) through the dipper trip lever on the swing clutch lever and secure with the cable clamp.

(15) Reeve the cable down through the pulley on the swing clutch lever, over to and around the trip actuator cable guide pulley on the left floorplate (fig. 18), and through the pulley and trip mechanism.

(16) Insert the cable through the eye on the bottom of the trip guide rod and

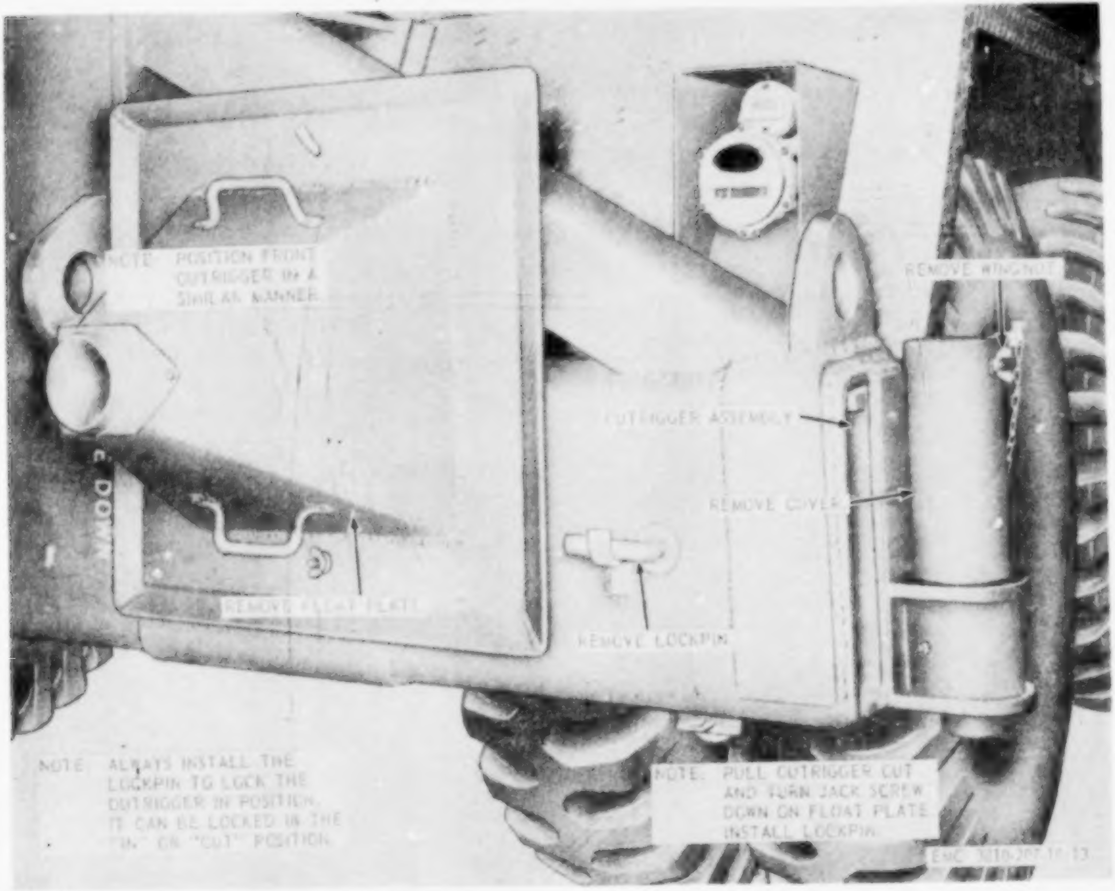

NOTE: POSITION FRONT OUTRIGGER IN A SIMILAR MANNER
REMOVE WINGNUT
OUTRIGGER ASSEMBLY
REMOVE COVER
REMOVE FLOAT PLATE
REMOVE LOCKPIN
NOTE: ALWAYS INSTALL THE LOCKPIN TO LOCK THE OUTRIGGER IN POSITION. IT CAN BE LOCKED IN THE "IN" OR "OUT" POSITION
NOTE: PULL OUTRIGGER OUT AND TURN JACK SCREW DOWN ON FLOAT PLATE INSTALL LOCKPIN.
EMC 3810-207-10/13

Figure 13. Outriggers, installed view.

secure with the cable clamp. Adjust the dipper trip actuator cable as instructed in *i* below.

(17) Insert the power trip cable through the cable pulley and secure it to the trip guide rod (fig. 18) of the power trip assembly with the cable clamp. Position the opposite end of the power trip cable in the outer half of the sheave of the boom trip drum (fig. 19) and secure with the cable clamp. Adjust the power trip cable as instructed in *i* below.

(18) Position the dipper trip cable around the drum, insert the cable end through the drum, and secure with the cable clamp. Loop the opposite end of the cable (fig. 20) through the trip chain and secure with the clamp. Adjust the dipper trip cable as instructed in *i* below.

(19) Adjust the trip mechanism return spring as instructed in *l* below.

(20) Adjust the trip mechanism support spring as instructed in *m* below.

d. Cable Reeving.

(1) Select the proper length cables for shovel operation (par. 4*b*(9)).

(2) Reeve the boom hoist cable (fig. 21) from the boom hoist drum to the top of the gantry guide sheave, over

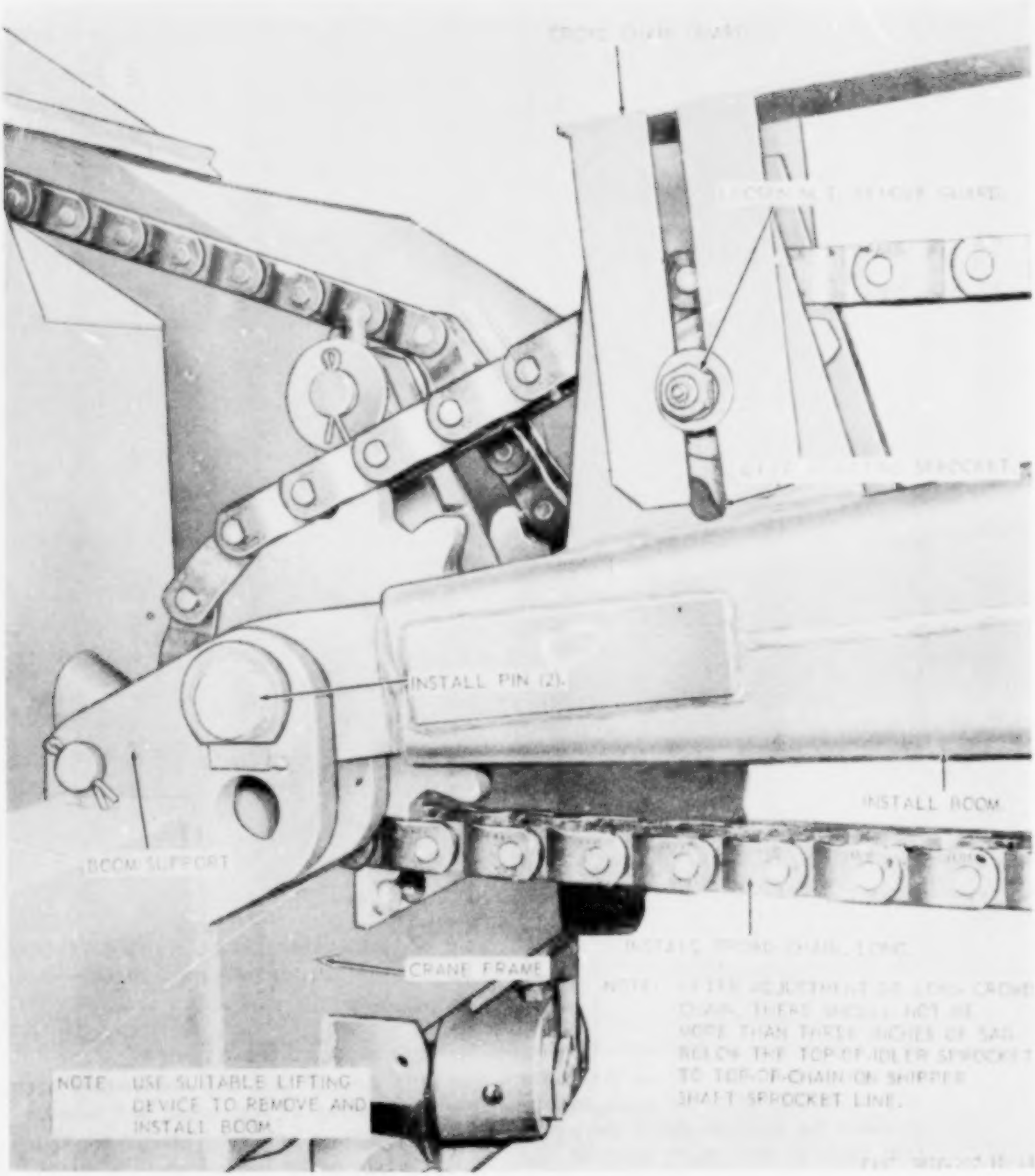
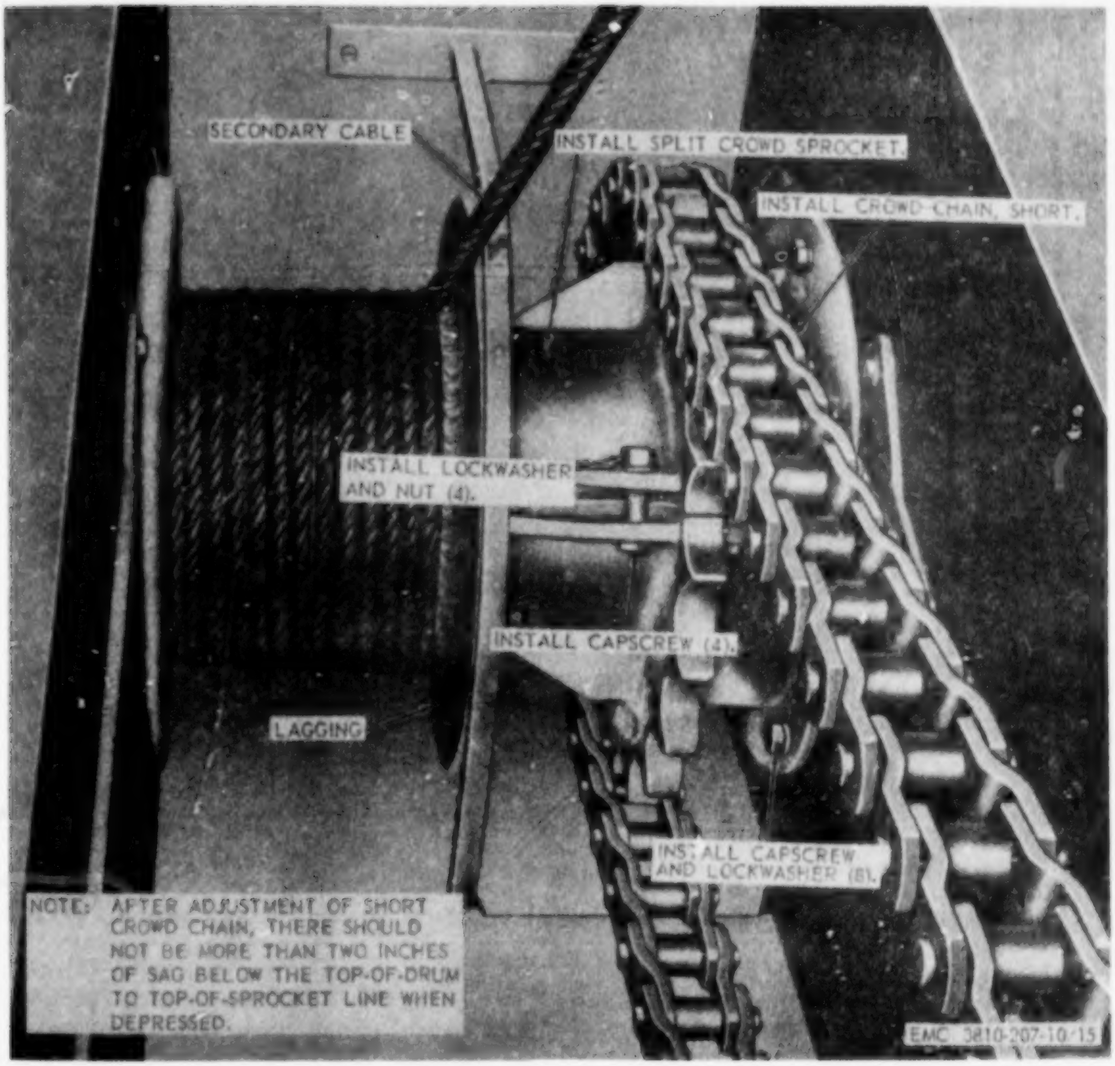

CROWD CHAIN GUARD
INSTALL PIN (2).
INSTALL BOOM
BOOM SUPPORT
INSTALL CROWD CHAIN, LONG
NOTE: AFTER ADJUSTMENT OF LONG CROWD CHAIN, THERE SHOULD NOT BE MORE THAN THREE INCHES OF SAG BELOW THE TOP-OF-IDLER SPROCKET TO TOP-OF-CHAIN ON SHIPPER SHAFT SPROCKET LINE.
CRANE FRAME
NOTE: USE SUITABLE LIFTING DEVICE TO REMOVE AND INSTALL BOOM

Figure 14. Shovel boom, removal and installation.

the top of the left boom hoist sheave, back to the left gantry sheave, across the center gantry sheave and right gantry sheave, down and over the right boom hoist sheave, and back to the dead end socket on the gantry sheave assembly; secure with the wedge.


SECONDARY CABLE
INSTALL SPLIT CROWD SPROCKET.
INSTALL CROWD CHAIN, SHORT.
INSTALL LOCKWASHER AND NUT (4).
INSTALL CAPSCREW (4).
LAGGING
INSTALL CAPSCREW AND LOCKWASHER (8).
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NOTE: AFTER ADJUSTMENT OF SHORT CROWD CHAIN, THERE SHOULD NOT BE MORE THAN TWO INCHES OF SAG BELOW THE TOP-OF-DRUM TO TOP-OF-SPROCKET LINE WHEN DEPRESSED.

Figure 15. Crowd and retract sprocket, removal and installation.

(3) Reeve the secondary cable from the secondary drum on the main shaft, over the right boom point sheave, under the padlock sheave on the dipper bail, and over the left boom point sheave. Dead end the cable at the dead end socket and secure with the wedge.

e. Short Crowd Chain Adjustment. When properly adjusted, the top center point of the short crowd chain (fig. 15) should not have more than two inches of sag below the top-of-drum to the top-of-sprocket line when depressed. When necessary, adjust the short crowd chain as follows:

(1) Loosen the top chain adjusting locknut and adjust the chain adjusting sprocket as necessary, by turning the lower adjusting nut. Turn the lower adjusting nut counterclockwise to

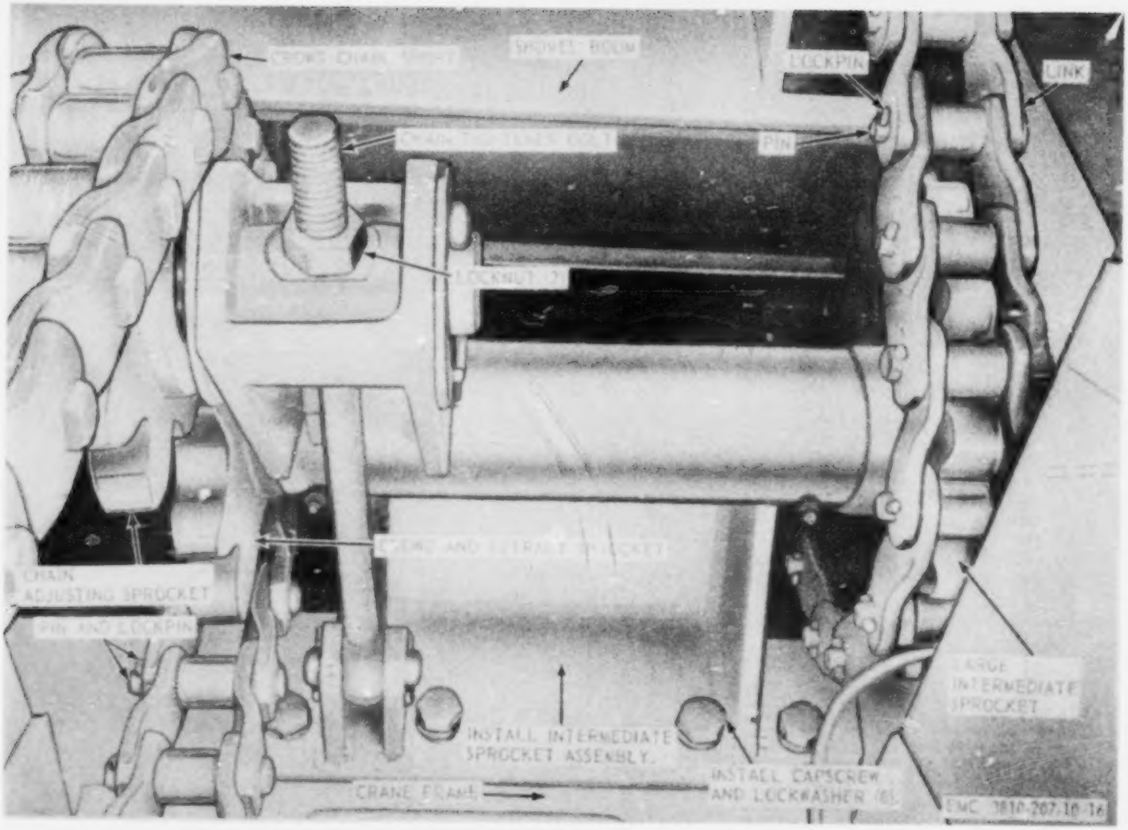

Figure 16. Intermediate crowd and retract sprocket, removal and installation.

tighten the short crowd chain. Turn the adjusting nut clockwise to loosen the short crowd chain.

(2) Secure the adjusting sprocket by tightening the top locknut.

f. Long Crowd Chain Adjustment. When properly adjusted, the top center point of the long crowd chain should not have more than three inches of sag below the top-of-idler sprocket to top-of-chain on shipper shaft sprocket line, when depressed. When necessary, adjust the long crowd chain as follows:

(1) Loosen the two nuts on both ends of the sprocket shaft.

(2) Using a prying device and wood block for leverage, position the adjustment idler sprocket so the long crowd chain has the desired adjustment for proper operation.

(3) To secure the idler sprocket shaft and idler sprocket in position, tighten the two nuts on the idler sprocket shaft.

g. Shovel Bucket Dipper Door Adjustment. If the shovel bucket dipper door (fig. 20) fails to stay closed, adjustment may be necessary for proper operation. Faulty operation may result from either incorrect spring tension or excessive latch pin wear. Adjust the spring and latch pin as follows:

(1) *Latch return spring.*

(*a*) Loosen the locknut on the spring adjusting bolt.

(*b*) Increase the spring tension as needed by turning the adjusting nut onto the adjusting bolt.

(*c*) Secure the adjustment by tightening the locknut on the adjusting bolt.

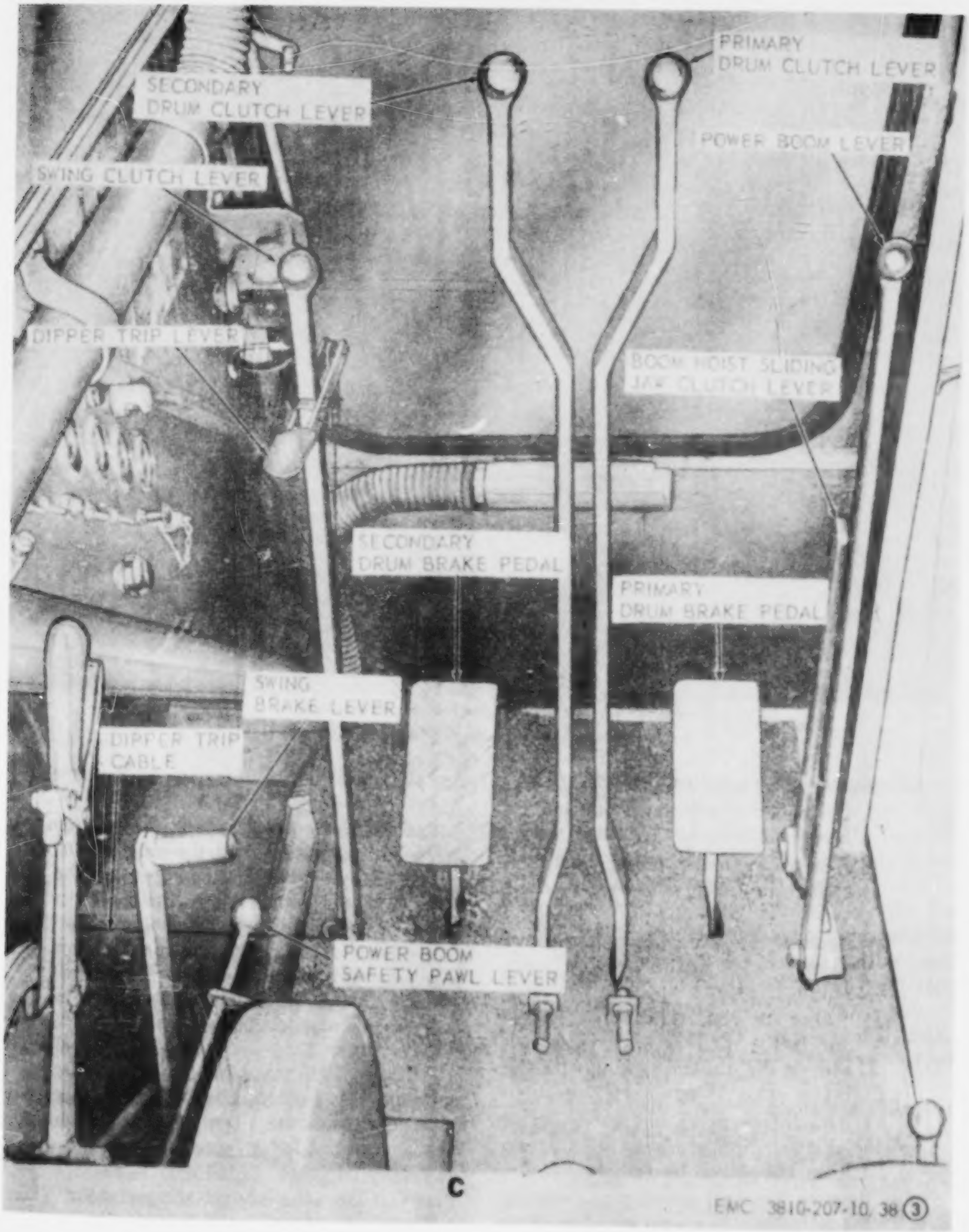
PRIMARY DRUM CLUTCH LEVER
SECONDARY DRUM CLUTCH LEVER
POWER BOOM LEVER
SWING CLUTCH LEVER
DIPPER TRIP LEVER
BOOM HOIST SLIDING JAW CLUTCH LEVER
SECONDARY DRUM BRAKE PEDAL
PRIMARY DRUM BRAKE PEDAL
SWING BRAKE LEVER
DIPPER TRIP CABLE
POWER BOOM SAFETY PAWL LEVER
C
EMC 3810-207-10, 38 ③

Figure 17. Dipper trip actuator cable, removal and installation, and control levers.

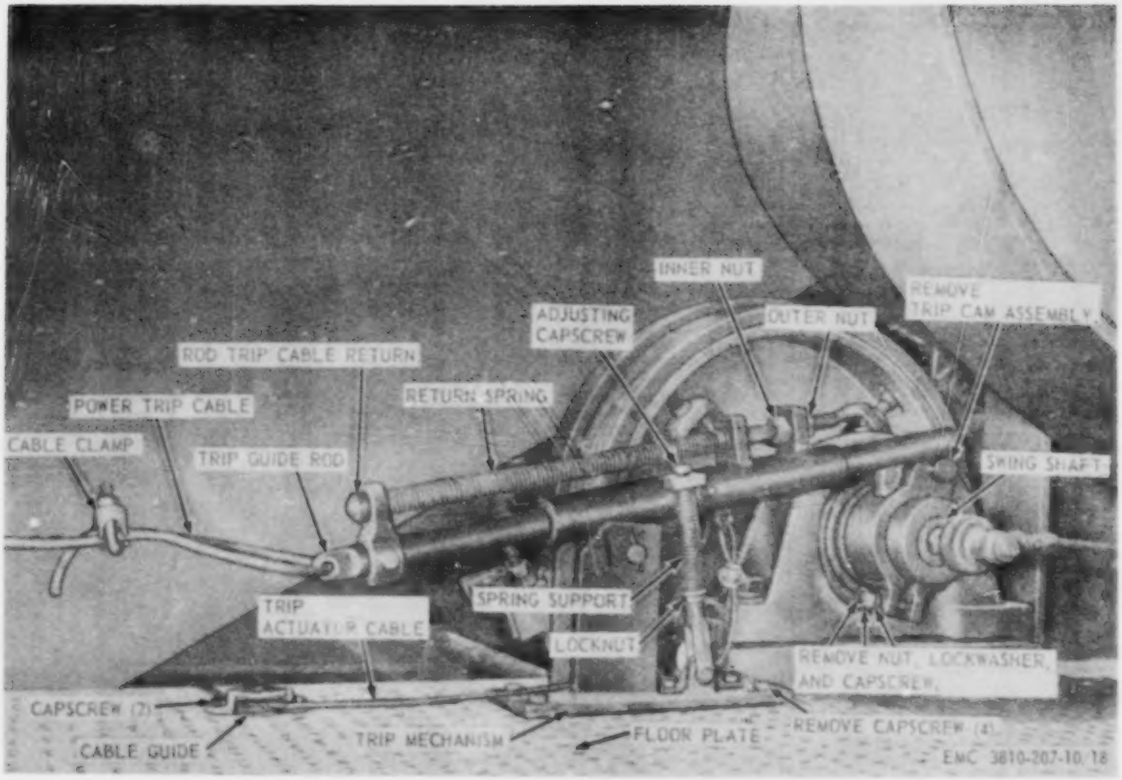

Figure 18. Dipper trip assembly, installed view.

(2) *Latch pin (additional length).*

(*a*) Disconnect the spring from the trip lever.

(*b*) Remove the cotter pin and pin, and swing the lever clockwise to clear the top of the latch pin.

(*c*) Remove the latch pin and remove shims to obtain additional pin length.

(*d*) Swing the lever counterclockwise and secure it to the latch pin by inserting the pin and locking with the cotter pin.

(*e*) Attach the spring to the trip lever.

h. Shovel Bucket Pitch Adjustment. Change bucket pitch on the shovel as follows:

(1) Remove the four cotter pins securing the adjusting link arm and the pitch links to the dipper stick pin.

(2) Remove the adjusting link arm from the dipper stick pin.

(3) Remove the dipper stick pin from the dipper stick and the pitch links.

(4) Move the shovel bucket to the desired pitch. Aline the hole in the dipper stick with the holes in the pitch links and insert the pin through the link and the dipper stick.

(5) Install the adjusting link arm on the pin and secure with the four cotter pins.

i. Dipper Trip and Power Trip Cable Adjustment. Two cables connected to the trip drum complete the power trip assembly. When necessary for proper operation, adjust the dipper trip cable as follows:

(1) Close the shovel dipper door (fig. 20), extend, and move the dipper stick to the horizontal position.

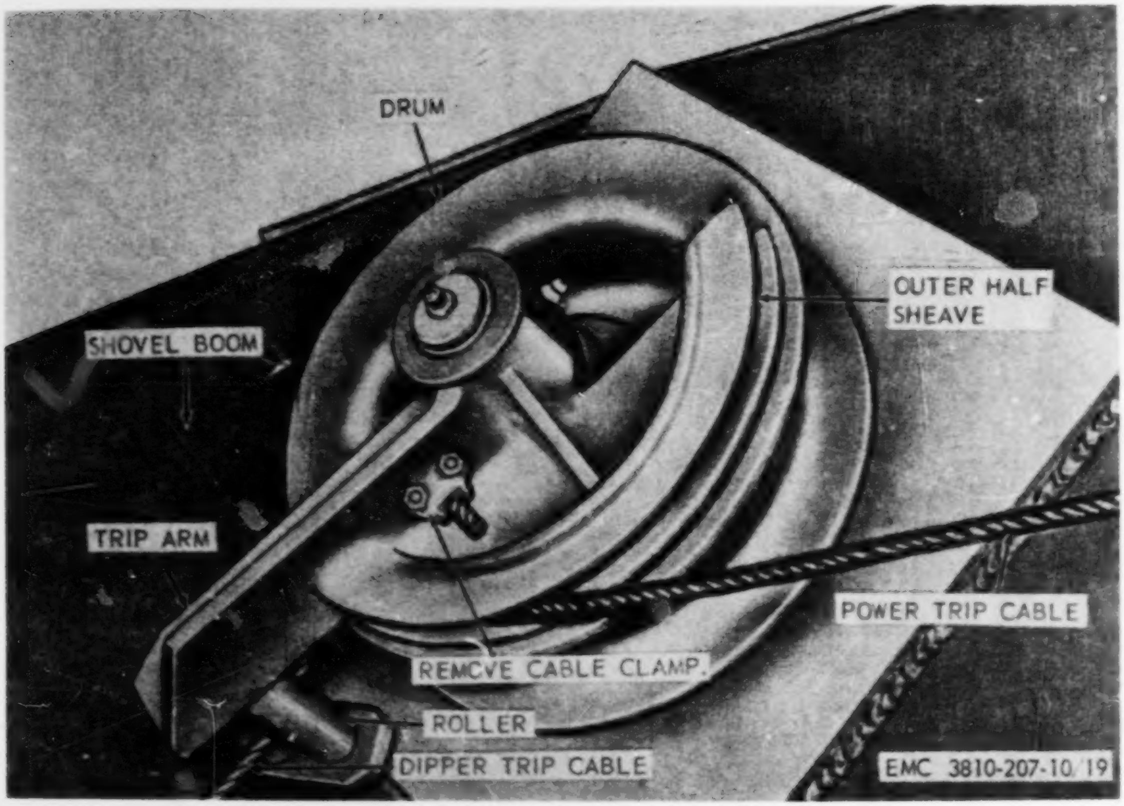

Figure 19. Boom trip drum assembly, installed view.

(2) Loosen the cable clamp and take up the slack in the dipper trip cable. Tighten the cable clamp to secure the adjustment. Proper adjustment is one-half wrap of cable with the dipper stick extended.

(3) Loosen the cable clamp securing the power trip cable to the trip guide rod of the dipper trip mechanism, and take up the slack in the cable. Tighten the cable clamp to secure the adjustment.

j. Saddle Block Adjustment.

(1) Loosen the sixteen locknuts and setscrews (fig. 22).

(2) Tighten the eight upper setscrews until the four upper rub plates are in contact with the dipper stick. Back off one full turn and secure with the eight upper locknuts.

(3) Tighten the eight lower setscrews by turning them counterclockwise until they come in contact with the four upper rub plates. Secure the eight lower setscrews with the locknuts.

(4) Using the four setscrews, adjust the two lower rub plates to a clearance of 1/32 inch from the dipper stick rack. Secure the four setscrews with the four locknuts.

Note. These adjustments also provide adequate tooth lash between the crowd gear and the dipper stick teeth.

k. Dipper Trip Cable Adjustment. Adjust the dipper trip cable as follows:

(1) Loosen the cable clamp (fig. 20) and take up the cable slack so that the power trip mechanism can be engaged and returned to a neutral position by depressing and releasing the

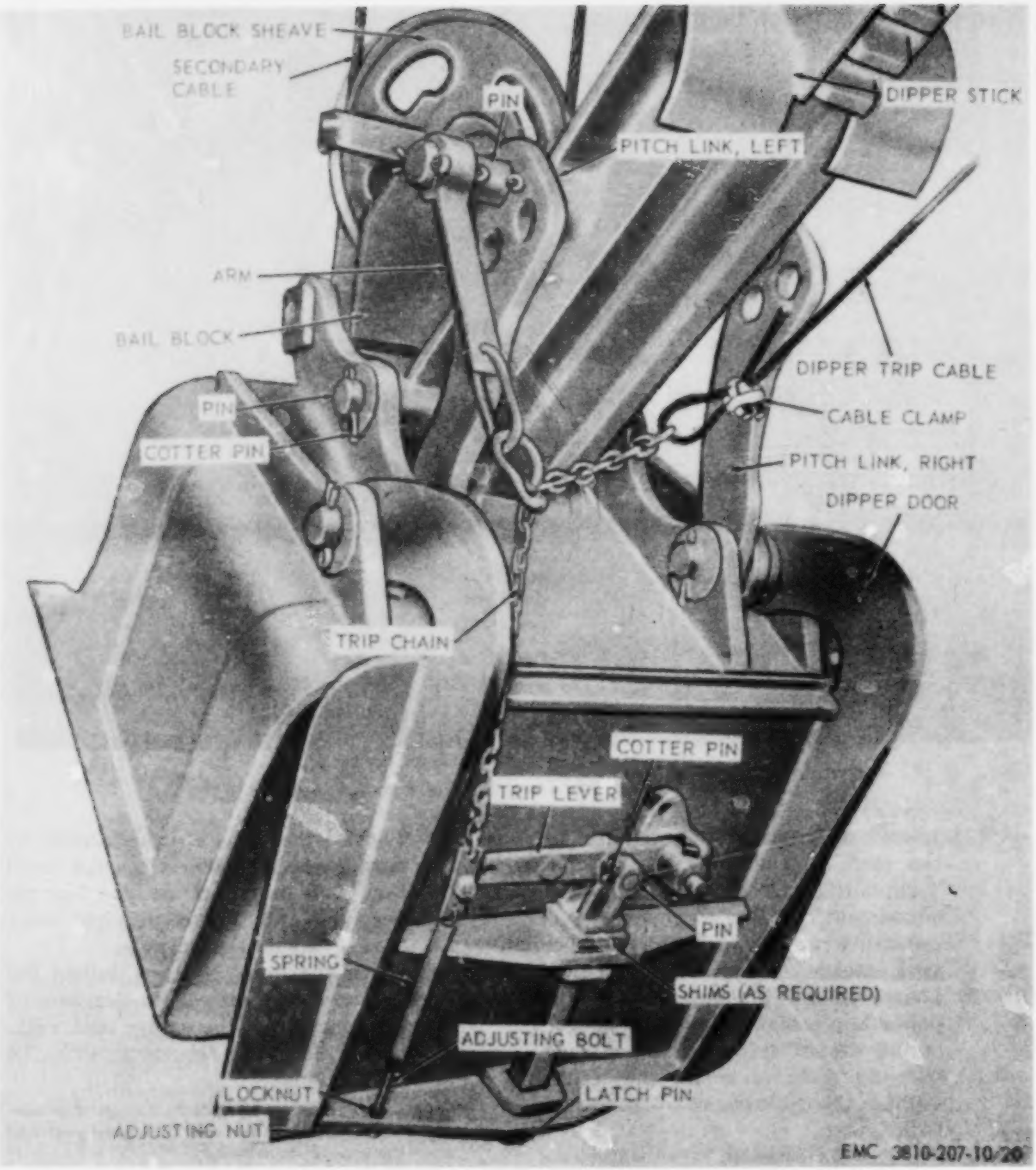

Figure 20. Shovel bucket adjustment.

dipper trip lever shown in figure 17.

(2) Secure the cable adjustment by tightening the cable clamp as shown in figure 17.

l. Trip Mechanism Return Spring Adjustment. When properly adjusted, the return spring will have sufficient tension to return easily the trip guide rod to the neutral position

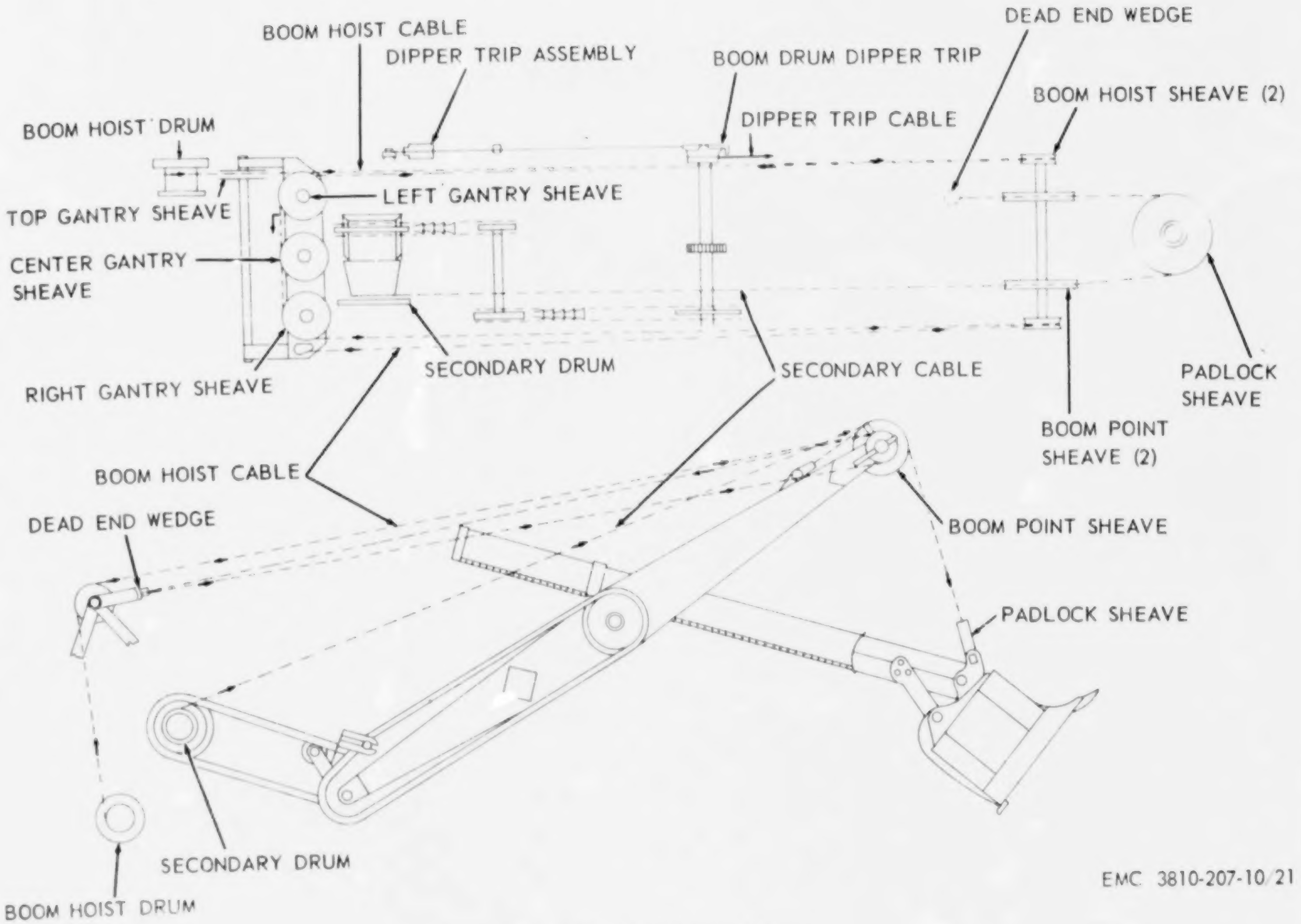

Figure 21. Shovel reeving diagram.

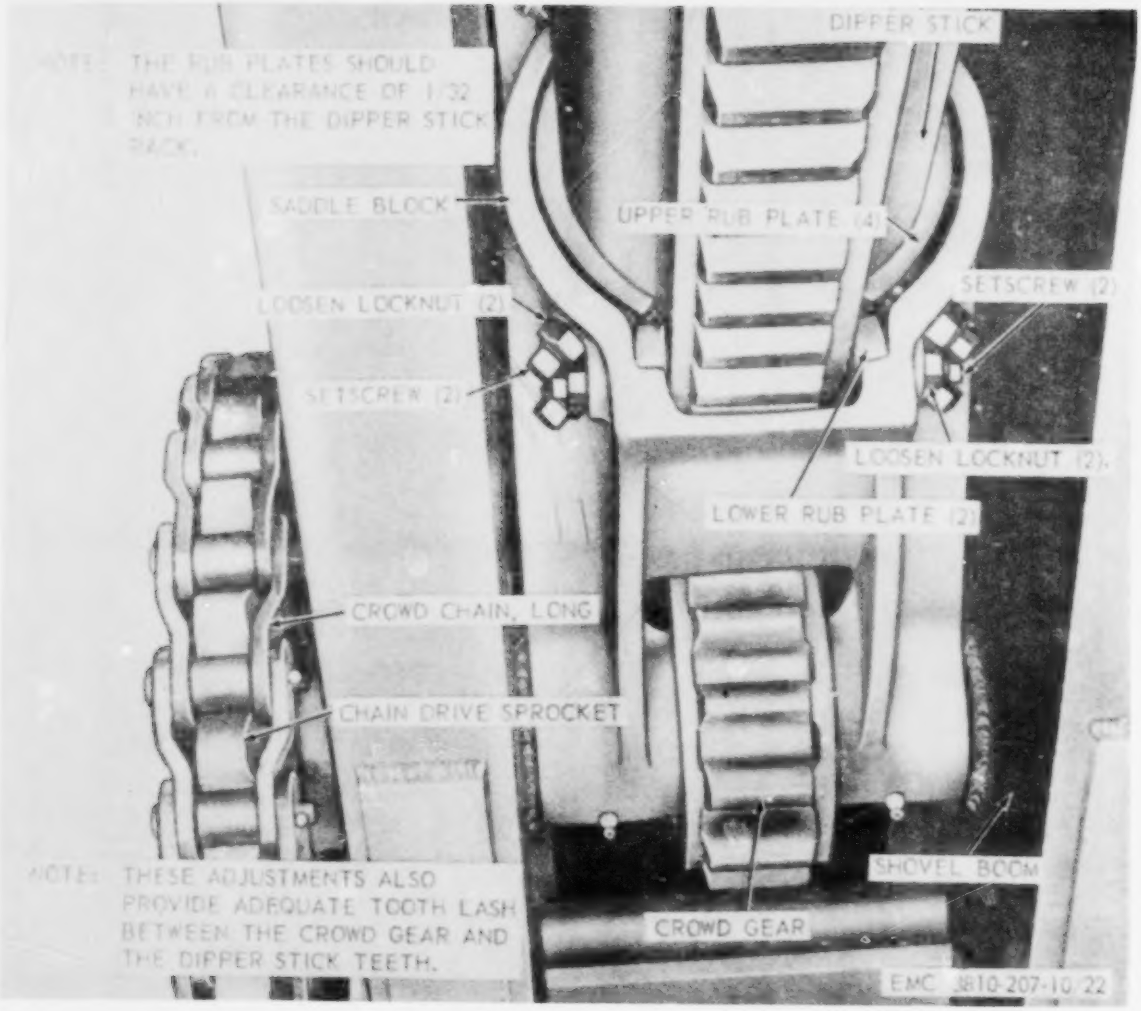

Figure 22. Saddle block adjustment.

(fig. 18). Adjust the return spring tension as follows:

(1) Loosen the inner nut.

(2) Tighten the outer nut to increase spring tension, or loosen to decrease spring tension as needed.

(3) Secure the adjustment by tightening the inner nut.

m. Trip Mechanism Support Spring Adjustment. When properly adjusted, the support spring (fig. 18) will have sufficient tension to maintain ample clearance between the trip cam assembly and the trip guide rod when the trip guide rod is in the neutral position. Adjust the support spring tension as follows:

(1) Loosen the locknut.

(2) Turn the adjusting capscrew counterclockwise to increase the trip cam-to-trip guide rod clearance or clockwise to decrease the clearance.

(3) Tighten the locknut to secure the adjustment.

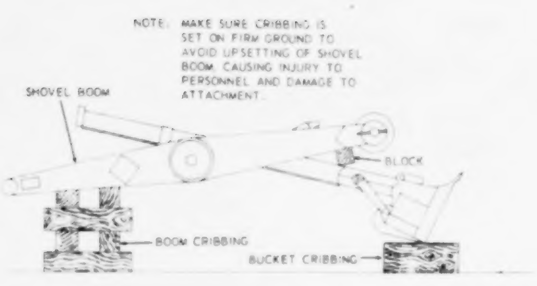
NOTE: MAKE SURE CRIBBING IS SET ON FIRM GROUND TO AVOID UPSETTING OF SHOVEL BOOM, CAUSING INJURY TO PERSONNEL AND DAMAGE TO ATTACHMENT.
SHOVEL BOOM
BLOCK
BOOM CRIBBING
BUCKET CRIBBING

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Figure 23. Shovel boom cribbing method.

n. Shovel Boom Removal.

(1) Retract the shovel bucket and lower the shovel boom to a horizontal position. Build up cribbing under the boom as illustrated in figure 23.

(2) Use a suitable lifting device to hold boom when moving carrier away from cribbed boom.

(3) Refer to figure 14 and remove the short crowd chain, split sprocket, long crowd chain, boom footpins, cable, and the power trip cable (fig. 18).

(4) Remove the crowd and retract mechanism (fig. 16).

(5) Clean, lubricate, identify, and store all cables and crowd chains.

10. Conversion for Crane Operation

a. General. The equipment used to convert the crane-shovel for crane operation consists of a boom, boom hoist cable, bridle sheave assembly, and boom stop cables. A boom extension may be used to increase the length of the main boom. When the machine is converted from shovel to crane operation, the crowd sprocket must be replaced with a lagging, and the intermediate crowd and retract sprocket must be removed from rotating frame. Adequate tools and organizational maintenance personnel will be needed to install crane attachment.

b. Crane Boom Installation.

(1) With the crane facing toward the rear of the carrier, back the unit into position, alining the upper main holes of the crane with the crane boom.

(2) Using a suitable lifting device, lift the boom into position, alining the bottom holes of the main frame boom support with the holes in the boom, and install the two boom footpins and cotter pins (fig. 14).

(3) Mount the two cable adapters (fig. 24) on the inside of the boom footpins.

(4) Secure the two boom stop cables to the two cable adapters.

(5) Secure the other ends of the stop cables to the boom.

(6) Secure the two springs to the center of the cables and to the boom with the four clamps.

(7) Secure the two pendant cables to the boom point links.

(8) Secure the bridle sheave assembly to the pendant cables.

c. Cable Reeving.

(1) Select the proper length and size of cables (par. 4*b*(9)).

(2) Reeve it over the top gantry guide sheave down through the crane cab, and secure it to the boom hoist drum with the wedge. Reeve the other end of the boom hoist cable over the top of the outside left-hand sheave of the bridle sheave assembly, around the left inside sheave of the bridle sheave, back around the center gantry sheave, over the top of right inside bridle sheave, back around the right gantry sheave, over the right outside bridle sheave, and back to the anchor on the gantry and secure with the cable wedge as illustrated in figure 24.

(3) Reeve from the primary drum on the main shaft to the left crane boom point sheave, through the left side sheave of the hook block, over the top of the center boom point sheave, through the right side sheave of the hook block, and back to the dead end socket at the boom tip. Secure with wedge.

(4) Reeve from the secondary drum on the main shaft to the right crane boom point sheave.

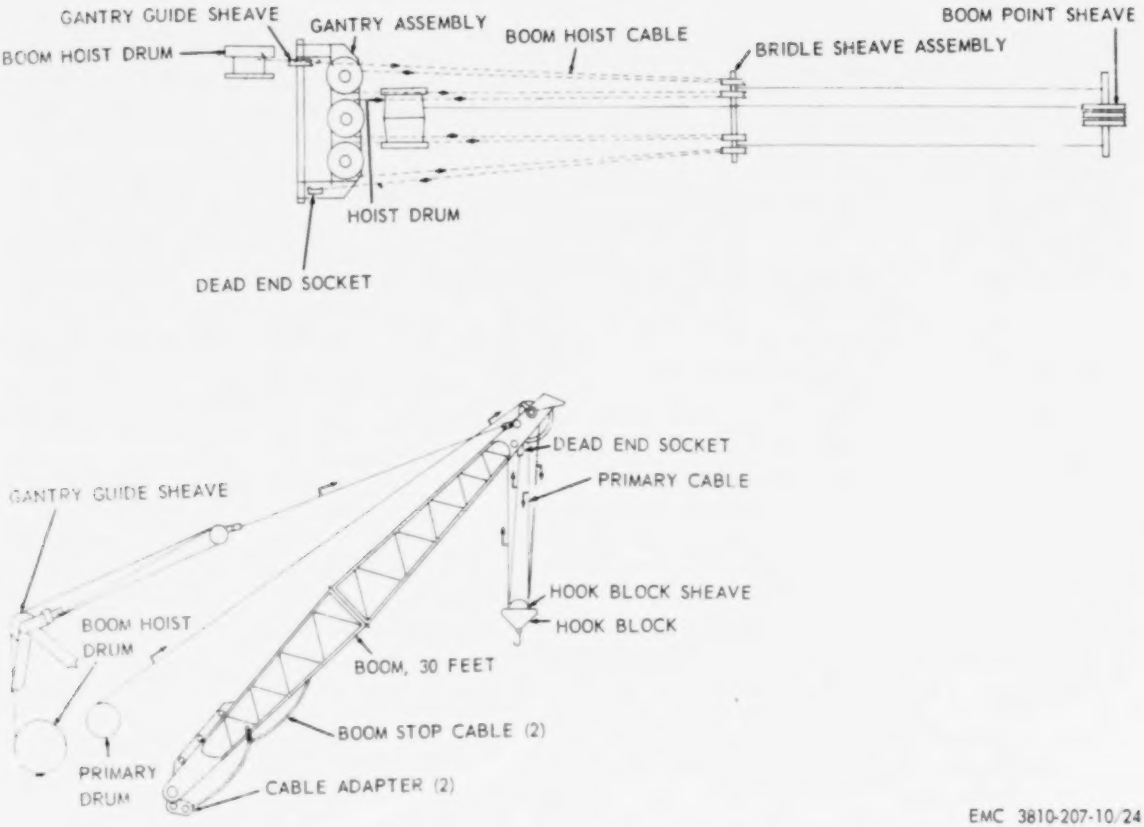

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Figure 24. Crane boom reeving diagram.

d. Crane Boom Removal.

(1) Lower the boom to a horizontal position and build up cribbing under the boom as illustrated in figure 25.

(2) Use wedges or jacks to relieve weight from the boom footpins. Remove the cotter pins, boom cable adapters, and boom footpins. Refer to figure 24.

(3) Remove the cables; clean, lubricate, and identify cables; and store.

(4) Move the crane away from the crane boom attachment.

11. Conversion for Jib Boom Operation

a. General. The equipment used to convert the unit for jib boom operation consists of a 30-foot boom, boom extension, jib strut, jib boom, and jib boom suspension cables. Adequate tools and organizational maintenance personnel will be needed to install the jib boom attachment.

b. Jib Boom Installation.

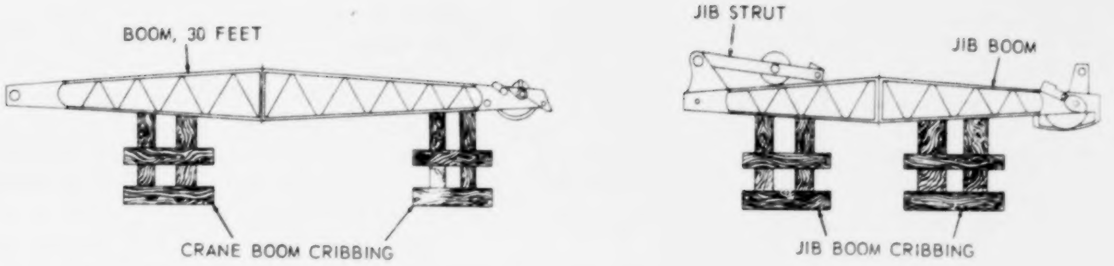
(1) Install the crane boom and hook block (par. 10).

(2) Secure the jib strut to the jib boom with the pin and cotter pins as illustrated in figure 26.

(3) Position the jib boom in the boom point supports and secure with the two pins, cotter pins, rod ends, lockwashers, and capscrews.

c. Cable Reeving.

(1) Secure the lower jib support cable in the dead end socket into the boom



NOTE: MAKE SURE CRIBBING IS SET ON FIRM GROUND TO AVOID UPSETTING OF BOOM, CAUSING INJURY TO PERSONNEL AND DAMAGE TO ATTACHMENT.

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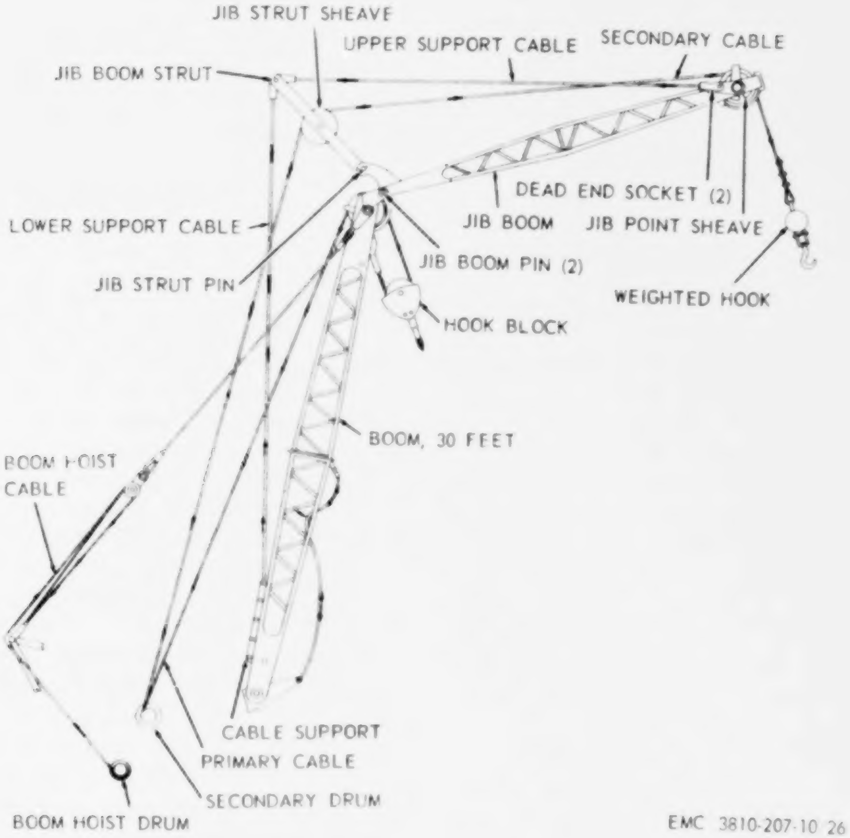
Figure 25. Crane boom and jib boom cribbing method.



EMC 3810-207-10 26

Figure 26. Jib boom reeving diagram.

cable support. Reeve the cable to the jib boom strut and secure it to the dead end socket on the jib boom strut. Position in the proper hole to give the desired jib boom angle.

(2) Reeve the upper jib boom point support cable from the jib boom strut to the dead end socket on the jib boom point.

(3) Using the proper length and size cable (par. 4*b*(9)), reeve the jib boom cable by securing one end on the secondary drum with the wedge. Reeve the cable between the boom pendant cables and the lower jib support cable, over the jib strut sheave, between the upper jib support cables, and over the jib boom point sheave.

(4) Secure the weight hook to the cable with the cable clamps.

d. Jib Boom Removal.

(1) Lower the boom and build up cribbing beneath the jib boom (fig. 25).

(2) Remove the jib lower support cables (fig. 26) from the cable supports; allow the jib boom strut to fall back on the jib boom.

(3) Remove the weight hook from the cable.

(4) Remove the jib cable from the jib boom and the right-hand drum.

(5) Remove the two cotter pins, capscrews, lockwashers, jib boom pin, and the jib boom from the crane boom. Remove the two rod ends from the jib boom pins.

(6) Remove the crane boom and cables (par. 10) and move the crane away from the crane and jib boom.

(7) Clean, lubricate, identify, and store cables.

12. Conversion for Back Hoe Operation

a. General. The equipment required for converting the crane-shovel to back hoe operation consists of an auxiliary gantry, padlock block assembly, hoe stick, pitch brace, and dipper. Adequate tools and organizational maintenance personnel will be needed to install back hoe attachment.

b. Back Hoe Installation.

(1) Remove the rear outrigger assembly (par. 9).

(2) Remove the split crowd sprocket and install the crane lagging on the primary drum. Remove the intermediate crowd and retract sprocket assembly from the crane frame.

(3) Using a suitable lifting device, lift the boom into position, alining the bottom holes of the main frame boom support with the holes in the boom, and install the boom foot-pins and cotters.

c. Cable Reeving.

(1) Using the proper length and size of cable (par. 4*b*(9)), reeve from the boom hoist drum to the top of the main gantry guide sheave, over the top of the left back hoe gantry sheave, back to the left gantry sheave, across to the right gantry sheave, under the right back hoe gantry sheave, and back to the main gantry cable anchor. Secure with the wedge (fig. 27).

(2) Reeve the primary cable from the primary drum on the main shaft, over the top of the back hoe gantry center sheave, to the padlock block sheave, and back to the anchor on the gantry; and secure with the wedge.

(3) Reeve the secondary cable from the secondary drum on the main shaft, through the hoe gantry frame, over the boom guide sheave, and to the padlock block assembly, back to the anchor on the boom; and secure with the wedge.

d. Back Hoe Bucket Angle Adjustment.

(1) Lower the bucket assembly to rest on the ground.

(2) Set and lock primary and secondary drum brakes.

(3) Remove the cotter pins and the dipper stick to bucket pin (fig. 7).

(4) Move the carrier back or forward until the desired holes are alined.

(5) The top hole adjustment of the bucket assembly will provide a shallow

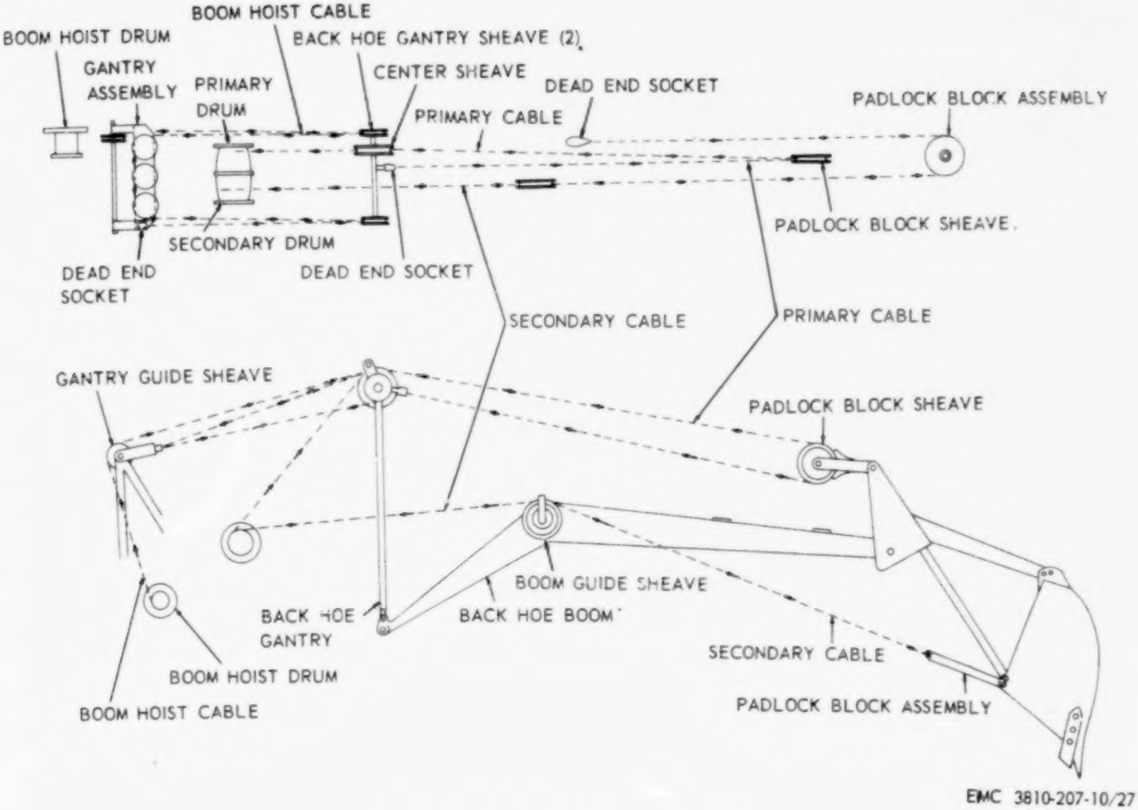


Figure 27. Back hoe reeving diagram.

cut, while the bottom hole adjustment will provide a deeper cut. The center hole adjustment will provide a medium cut.

(6) Install the dipper stick pin and cotter pins.

e. Back Hoe Removal.

(1) Extend the hoe bucket and lower the boom (fig. 28). Build up cribbing under the bucket to such a height that when the boom is lowered, the bucket assembly will rest on the cribbing (fig. 28).

(2) Lower the back hoe gantry so it will rest on the boom.

(3) Remove the wedge and cables.

(4) With a suitable lifting device, lift the boom foot enough to remove the boom footpin.

(5) Move carrier away from boom and build crib under boom foot (fig. 28).

(6) Install boom footpins in boom; clean, lubricate, identify, and store cables.

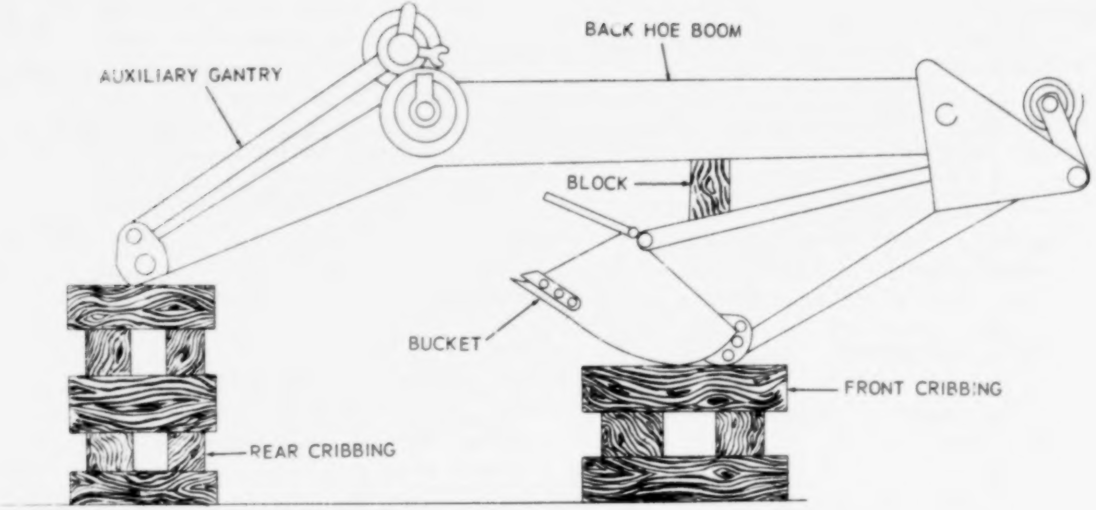
(7) Install the rear outrigger assembly (par. 18).

13. Tag Line Assembly Conversion

a. General. The tag line assembly is a spring-loaded device designed to maintain a constant tension on the clamshell bucket, through a cable, to prevent rotation and oscillation. It consists of a wheel attached to a shaft, held in a loaded position by the tag line spring, and inclosed in a housing half filled with oil as a dampening medium.

b. Tag Line Installation.

(1) Install the tag line assembly in the boom base section (fig. 29).



WARNING: MAKE SURE CRIBBING IS SET ON FIRM GROUND TO AVOID UPSETTING OF BACK HOE, CAUSING INJURY TO PERSONNEL AND DAMAGE TO ATTACHMENT.

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Figure 28. Back hoe cribbing method.

(2) Remove the tag line cable from the cable wheel, reeve it between the two pulleys in the fair-lead arm, and secure it to the clamshell bucket chain with a cable clamp.

c. Tag Line Cable Adjustment. Adjust the tag line cable tension by taking up cable wraps, by hand, until the proper tension is reached. Full tension should be reached in five to seven turns from neutral. Final tension is left to the operator.

Note. The amount of spring tension will be determined by the length and angle of the boom.

d. Tag Line Removal.

(1) Remove the cable clamp and the tag line cable from the clamshell bucket chain.

(2) Wind the tag line cable on the tag line cable wheel.

(3) Remove the tag line assembly from the boom base section (fig. 29).

14. Conversion for Clamshell Operation

a. General. The equipment used in converting the crane-shovel for clamshell operation consists of a boom, tag line, clamshell bucket, closing line cable, and holding line cable. When converting from shovel to clamshell operation, it is necessary to remove the split sprocket and the intermediate sprocket, and install the primary drum lagging. Adequate tools and organizational maintenance personnel will be needed to install the clamshell attachment.

b. Clamshell Installation. Install the boom and boom stop cables (par. 10).

c. Cable Reeving.

(1) Install the tag line cable (par. 13).

(2) Install the primary cable on the primary drum and secure with the wedge.

(3) Refer to figure 30 and reeve secondary cable over the secondary cable drum, out over the left boom point

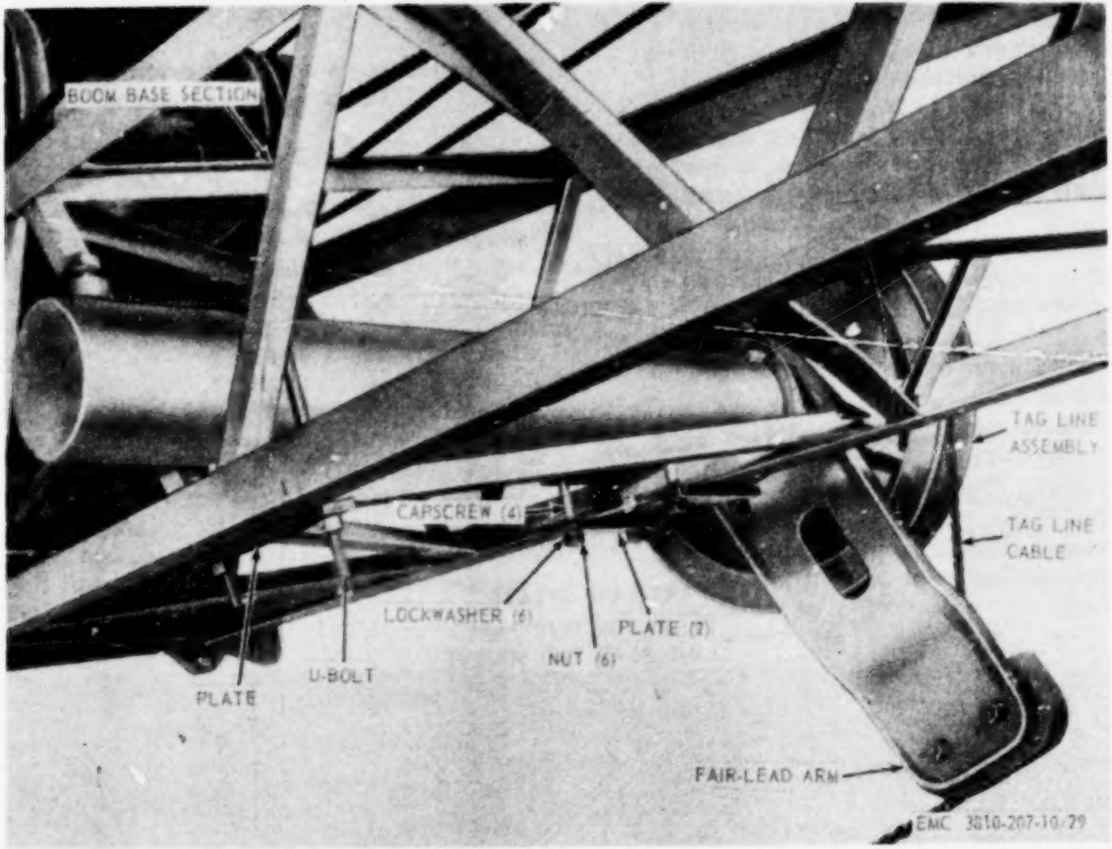


Figure 29. Typical tag line, installed view.

sheave, and secure to the secondary cable dead end socket on the bucket.

(4) For a two-part line, install the closing cable over the secondary drum and secure with the wedge.

(5) Reeve the cable out over the right boom point sheave, through the clamshell bucket guide rollers, under the two-part line sheave and dead end socket.

(6) For a three-part line, install the secondary cable over the secondary drum and secure with the wedge.

(7) Reeve the secondary cable out over the right boom point sheave, through the clamshell bucket guide rollers, under the two-part line sheave, over three-part line sheave, and dead end to the dead end socket.

(8) For a four-part line, install the secondary cable over the secondary drum and secure with the wedge.

(9) Reeve the secondary cable out over the right boom point sheave, through the clamshell bucket guide rollers, under two-part line sheave, over three-part line sheave, under four-part line sheave, and dead end to the dead end socket.

(10) For a five-part line, install the secondary cable over the secondary drum and secure with the wedge.

(11) Reeve the secondary cable out over the right boom point sheave, through

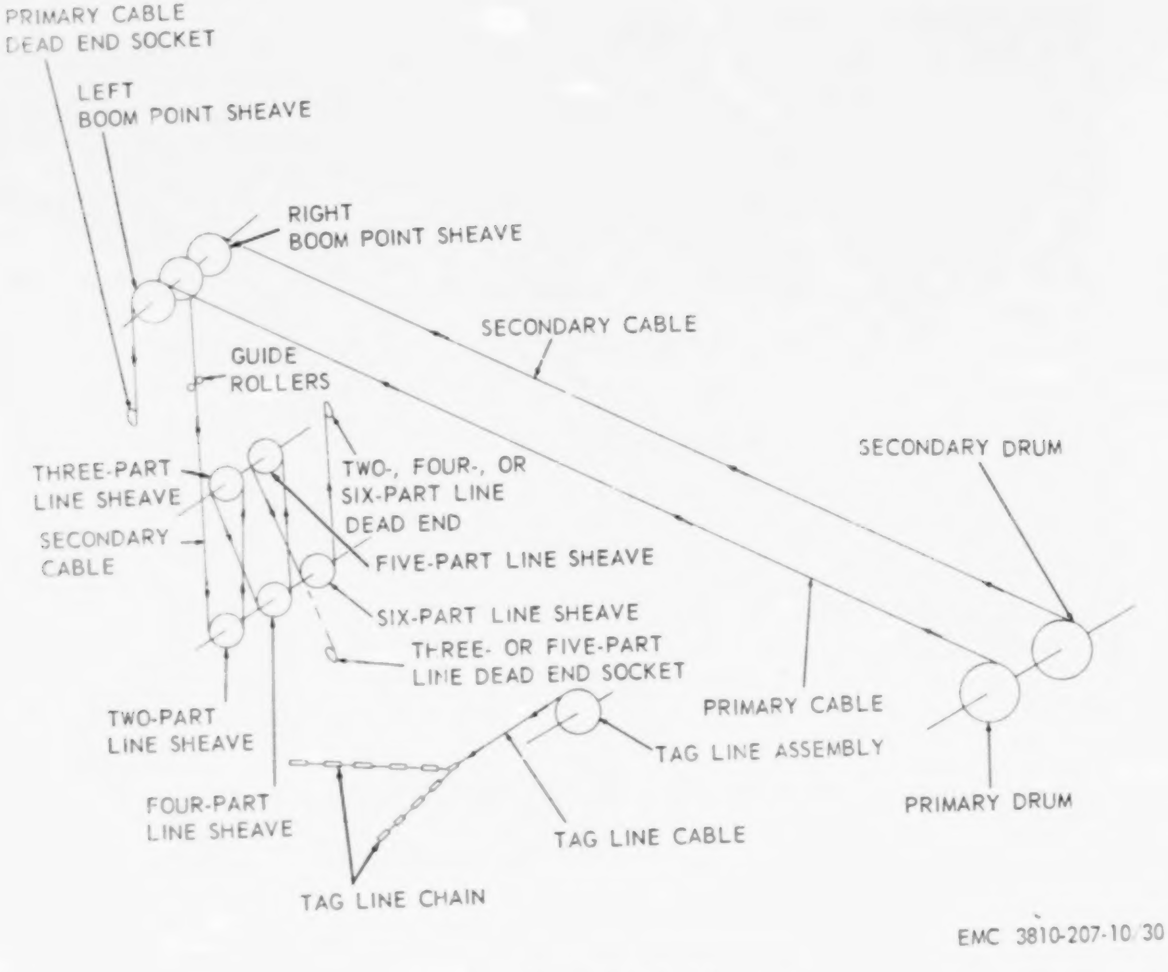


Figure 30. Clamshell reeving diagram.

the clamshell bucket guide rollers, under two-part line sheave, over three-part line sheave, under four-part line sheave, over five-part line sheave, and dead end at the dead end socket.

(12) For a six-part line, install the secondary cable over the secondary drum and secure with the wedge.

(13) Reeve the secondary cable out over the right boom point sheave, through the clamshell bucket guide rollers, under the two-part line sheave, over the three-part line sheave, under the four-part line sheave, over five-part line sheave, under six-part line sheave, and dead end at the dead end socket.

d. Clamshell Removal.

(1) Remove the tag line assembly (par. 13).

(2) Remove the secondary cable by removing the wedge from dead end socket. Pull cable from sheaves and remove wedge from secondary drum.

(3) Remove the primary cable from the dead end socket on the bucket; remove cable from left boom point sheave and the primary drum.

(4) Coil, lubricate, identify, and store cables.

(5) Remove the crane boom stop cables and crane boom (par. 10).

15. Fair-Lead Assembly Conversion

a. General. The fair-lead is mounted in the bottom of the boom base section to guide secondary cable from the bucket to the secondary drum. The bucket swings freely during operation and the cable angle to the drum would change greatly and cause cross-wrapping of the drum if not for fair-lead. The fair-lead is equipped with two vertical rollers and two horizontal sheaves to receive the secondary cable from any operating angle and feed it evenly to the secondary drum, past its constant-pulley action.

b. Fair-lead Installation. Install the fair-lead crosstube in position in the boom base section (fig. 31).

(1) Secure with the eight lockwashers and capscrews.

(2) With a suitable lifting device, position the fair-lead assembly in the boom base section.

(3) Secure the top of the fair-lead assembly to the boom crosstube with the shims, as required, two U-bolts, four lockwashers, and nuts.

(4) Secure the base of the fair-lead assembly to the fair-lead crosstube with the two U-bolts, four lockwashers, and nuts.

c. Fair-lead Adjustment. The pitch of the rear of the fair-lead may be adjusted in two positions. The rear, or bottom of the fair-lead, can be adjusted forward to compensate for low-boom angle, or back for high-boom angle.

(1) To adjust the bottom of the fair-lead, remove the four nuts, lockwashers, and U-bolts from the fair-lead and crosstube.

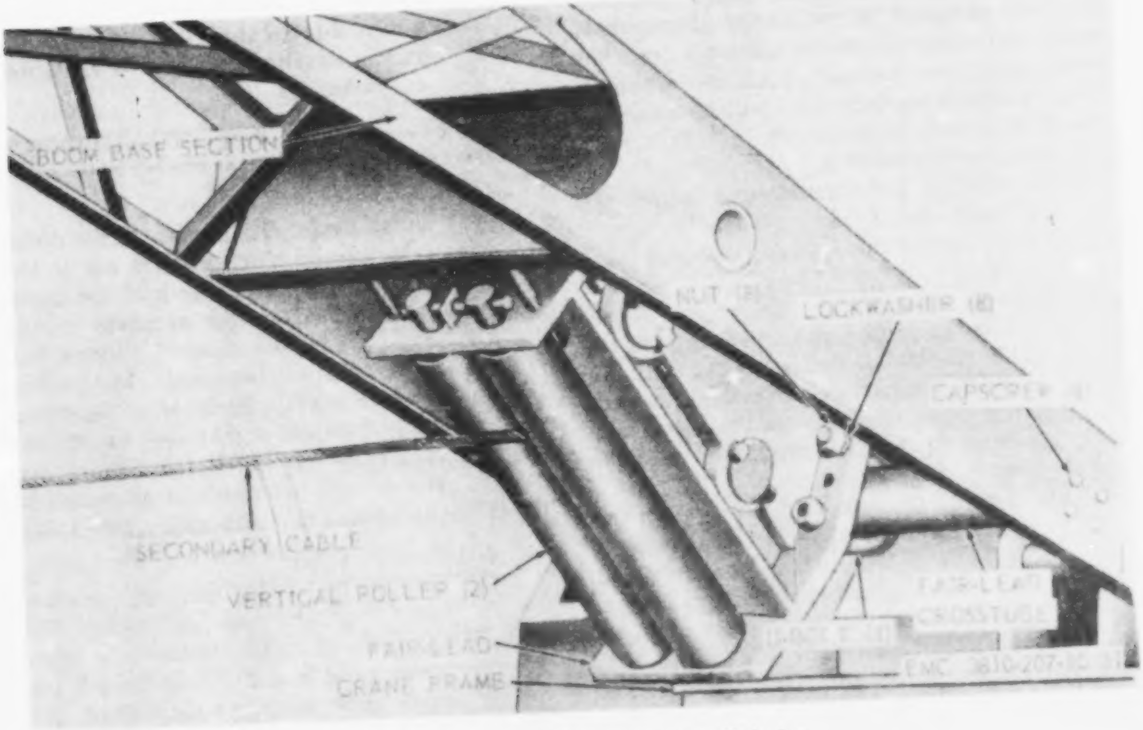


Figure 31. Fair-lead assembly, installed view.

(2) After the desired adjustment is obtained, install the two U-bolts around the crosstube and in the desired holes of the fair-lead. Secure with the four lockwashers and nuts.

d. Fair-lead Removal.

(1) Attach a suitable lifting device to the fair-lead.

(2) Remove the eight nuts, lockwashers, and the four U-bolts.

(3) Remove the fair-lead assembly from the boom base section (fig. 31).

(4) Remove the eight capscrews, lockwashers, and the fair-lead crosstube from the boom base section.

16. Conversion for Dragline Operation

a. General. The equipment required for converting the crane-shovel for dragline operation consists of a boom, primary cable, dump cable, dragline bucket, secondary cable, and a fair-lead. When converting from a shovel operation, it is necessary to remove the split crowd sprocket and install the primary drum lagging. It is also necessary to remove the intermediate crowd and retract sprocket assembly from the revolving frame. Adequate tools and organizational maintenance personnel will be needed to install the dragline attachment.

b. Dragline Installation.

(1) Position the machine and install the boom (par. 10).

(2) Install the fair-lead in the boom (par. 15).

c. Cable Reeving.

(1) Use the proper size and length of cable for the secondary cable (par. 4*b* (9)). Secure one end of the secondary cable (fig. 32) to the secondary drum on the main shaft and wind the cable on the drum.

(2) Unwind the secondary cable from the secondary drum on the main shaft; pull the cable through the fair-lead horizontal sheaves and vertical rollers. Secure the cable to the drag hitch on the drag chain with the wedge.

(3) Secure the dump cable to the socket of the drag hitch with the wedge. Reeve the other end of the dump cable through the dump block and secure it to the dump cable dead end socket on the bucket.

(4) Install the primary cable on the main shaft primary drum. Reeve the primary cable over the right boom point sheave and secure it to the dead end socket on the bail chain with the wedge.

d. Adjustment.

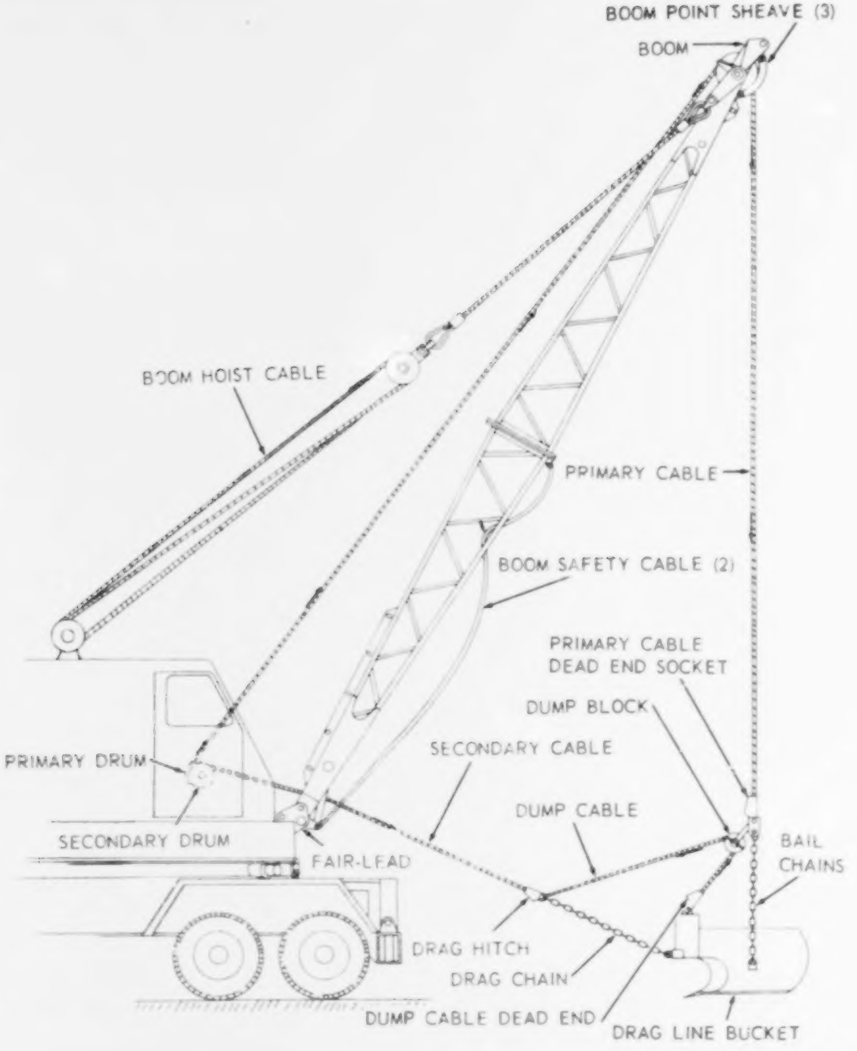
(1) *Depth of cut.* To adjust the depth of cut, it is necessary to raise or lower the drag chain hitch clevises at the front of the dragline bucket. Remove the nuts and bolts securing the drag chain to the drag bucket. For normal digging install the drag chain hitch clevises in the center position. Secure the drag chain hitch clevises to the dragline bucket with the bolts and nuts. Install the drag chain hitch clevises at the upper holes at the front end of the dragline bucket if a deeper cut is desired, or at the lower holes in the dragline bucket if a shallower cut is desired.

Note. Be sure that both drag chains are attached in the same position on the dragline bucket or the bucket will cut at an angle.

(2) *Dump cable.* The length of the dump cable should allow a slight sag in the drag chains. The length of the dump cable will affect the dumping of the bucket. If the bucket dumps too soon, shorten the cable by pulling through additional cable at the dump cable dead end socket, and cut off excess cable. If the bucket dumps too late or will not dump at all, lengthen the dump cable or install a new cable.

e. Dragline Removal.

(1) Remove the wedge and the primary cable from the dead end socket. Pull the primary cable through the right boom point sheave. Remove the primary cable from the main shaft primary drum. Clean, lubricate, identify, and store the primary cable.



EMC 3810-207-10/32

Figure 32. Dragline reeving diagram.

(2) Remove the wedge and the secondary cable from the secondary hitch. Pull the cable through the rollers and sheaves of the fair-lead. Remove cable coil, lubricate, identify, and store the secondary cable.

Note. Do not remove the dump cable from the bucket. This is the only place it is used, and it should stay on the bucket.

(3) Remove the fair-lead from the boom (par. 15).

(4) Remove the boom from the crane (par. 10).

17. Conversion for Piledriver Operation

a. General. The equipment used in converting the crane-shovel for piledriver operation consists of a boom, pile adapter, pile leads, catwalk, drop hammer, pile cap hoist, cable, and a hammer cable. The drop hammer moves up and down between the hammer guides of the pile leads. When converting from shovel to piledriver operation, the shovel split sprocket and the intermediate sprocket assembly must be removed. Crane lagging must be used in place of the split sprocket. Adequate tools and organizational maintenance personnel will be needed to install piledriver attachment.

b. Piledriver Adapter Installation.

(1) Install the crane boom (par. 10).

(2) Secure one adapter to the upper piledriver lead (fig. 33).

(3) Move the boom in position and aline the boom sheave shaft with the hole in the adapter.

(4) Remove the capscrews, nuts, lockwashers, and collars from the sheave shaft.

(5) Move the boom on the upper lead and insert the sheave shaft through the adapter.

(6) Position the other adapter on the opposite side of the sheave shaft. Secure the two adapters to the sheave shaft.

(7) Secure the adapter to the upper piledriver lead with the bolts.

c. Cable Reeving.

(1) Using the proper size and length of cable (par. 4*b*. (9)). for the primary cable (fig. 34), secure one end to the main shaft primary drum and wind the cable onto the primary drum (fig. 32).

(2) Unwind the primary cable from the primary drum on the main shaft and reeve it over the left boom point sheave and pull it to the bottom of the piledriver lead assembly.

(3) Unwind the secondary cable from the secondary drum, reeve it over the right boom point sheave, install the thimble and secondary cable through the ball and hook, and secure with the cable clamps and nuts.

(4) Secure the lower piledriver lead to the upper piledriver lead.

(5) Raise the boom slowly to hoist the lead assembly in the upright position. If possible, back the carrier slowly as the boom is hoisted to prevent dragging the leads over the ground.

(6) Secure the rear section of the catwalk to the mounting brackets on the main frame.

(7) Slide the center section of the catwalk out of the rear section, and the catwalk front section out of the catwalk center section.

(8) Secure the center section to the rear section.

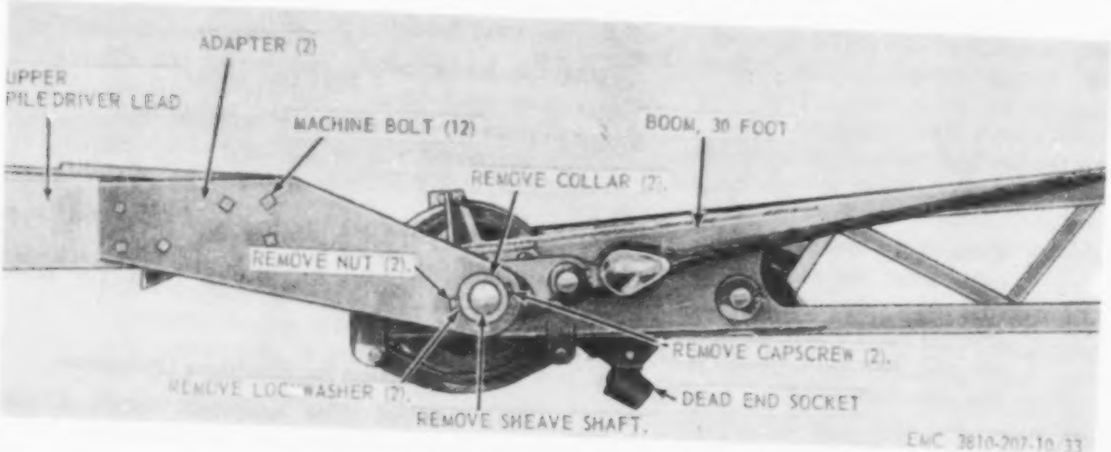


Figure 33. Piledriver adapters, installed view.

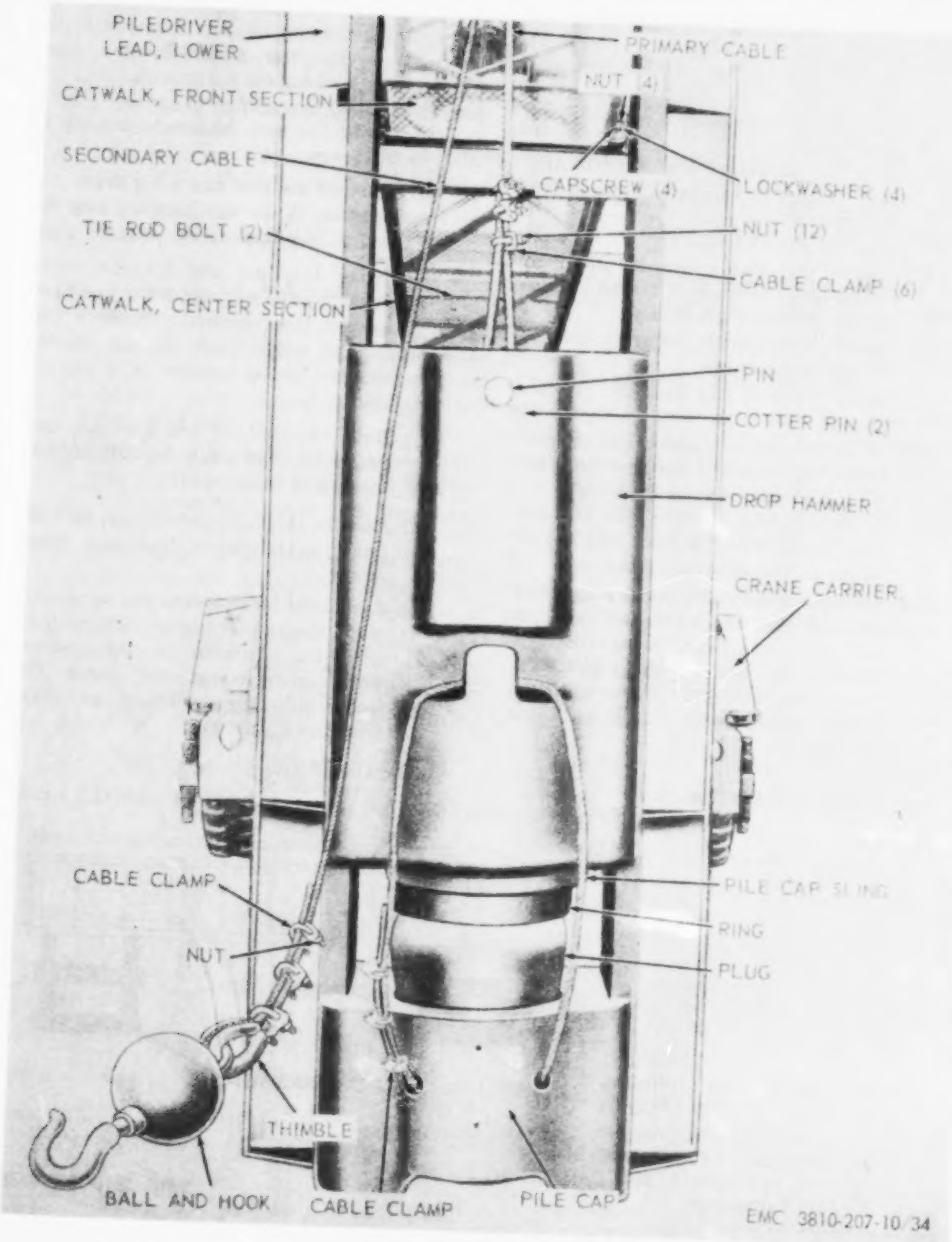


Figure 34. Piledriver lead and hammer, installed view.

(9) Secure the catwalk front section to the center section. Adjust the length of the catwalk to the various positions and angles of the piledriver.

(10) Secure the catwalk front section to the piledriver lead.

(11) Lift the piledriver lead four to five feet. Move the carrier and crane into position so the lead will be directly over the drop hammer.

(12) Lower the lead over the hammer. Make sure the track of the lead slides in the groove of the hammer.

(13) Secure the primary cable to the pin in the drop hammer.

(14) Raise the lead and hammer off the ground.

(15) Move the carrier and crane as necessary to aline the hammer and the lead over the plug and pile cap.

(16) Lower the lead over the plug and pile cap. Make sure the track of the lead slides in the grooves of the cap.

(17) Insert one end of the pile cap sling through the hole in the left side of the pile cap, and bring it back through the hole in the right side. Secure the two ends of the pile cap sling together with the three cable clamps.

(18) Lower the hammer in the plug; secure the cap to the hammer with the pile cap sling. Raise the lead, hammer, and cap off the ground.

d. Piledriver Removal.

(1) Lower the lead, hammer, and cap to the ground.

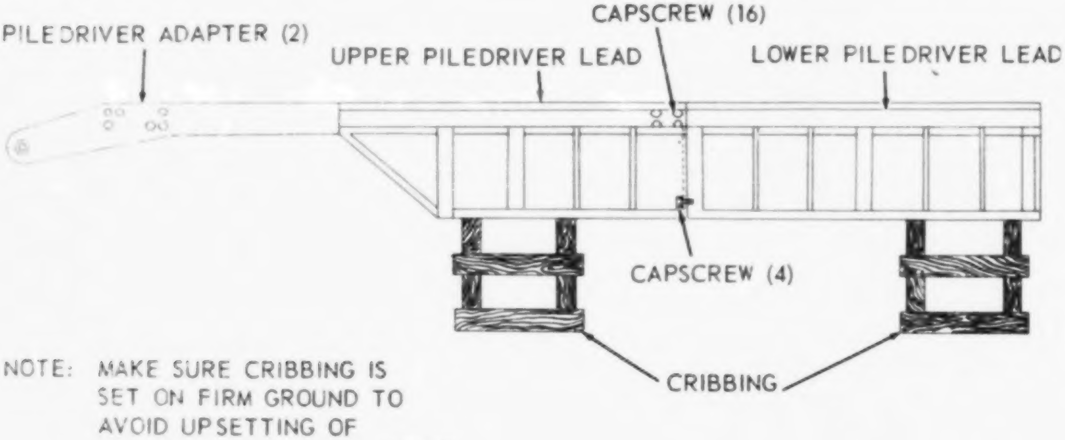
(2) Remove the pile cap sling from the hammer. Raise the hammer and the lead to remove the cap and the plug.

(3) Swing the lead and hammer away from the pile cap and lower the hammer to the ground. Remove the primary cable from the pin in the hammer. Store hammer and cap on blocks.

(4) Raise the lead off the hammer and swing the lead away from it. Lower the lead to the ground.

(5) Remove the front and rear catwalk from the piledriver lead and crane frame.

(6) Lower the boom and at the same time move the carrier ahead. Before lowering the piledriver to the ground, built up cribbing and lower the leads onto the cribbing as illustrated in figure 35.



NOTE: MAKE SURE CRIBBING IS SET ON FIRM GROUND TO AVOID UPSETTING OF PILEDRIVER, CAUSING INJURY TO PERSONNEL AND DAMAGE TO ATTACHMENT.

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Figure 35. Piledriver cribbing method.

(7) Remove the cable clamps, pile hook secondary cable, and thimble from the ball and hook.

(8) Remove the two capscrews, nuts, lockwashers, and collars from the boom sheave shaft.

(9) Remove the bolts and one adapter from the piledriver lead.

(10) Move the boom as necessary and remove the sheave shaft from the other adapter.

(11) Secure the two collars to the sheave shaft.

(12) Remove the primary cable from the left boom point sheave and the main shaft primary. Clean, lubricate, identify, and store cable.

(13) Remove the pile hook secondary cable from the right boom point sheave (located on the top end of the crane boom). Remove the pile hook secondary cable from the secondary drum on the main shaft. Clean, lubricate, identify, and store cable.

(14) Remove the boom (par. 10).

18. Rear Outrigger Assembly

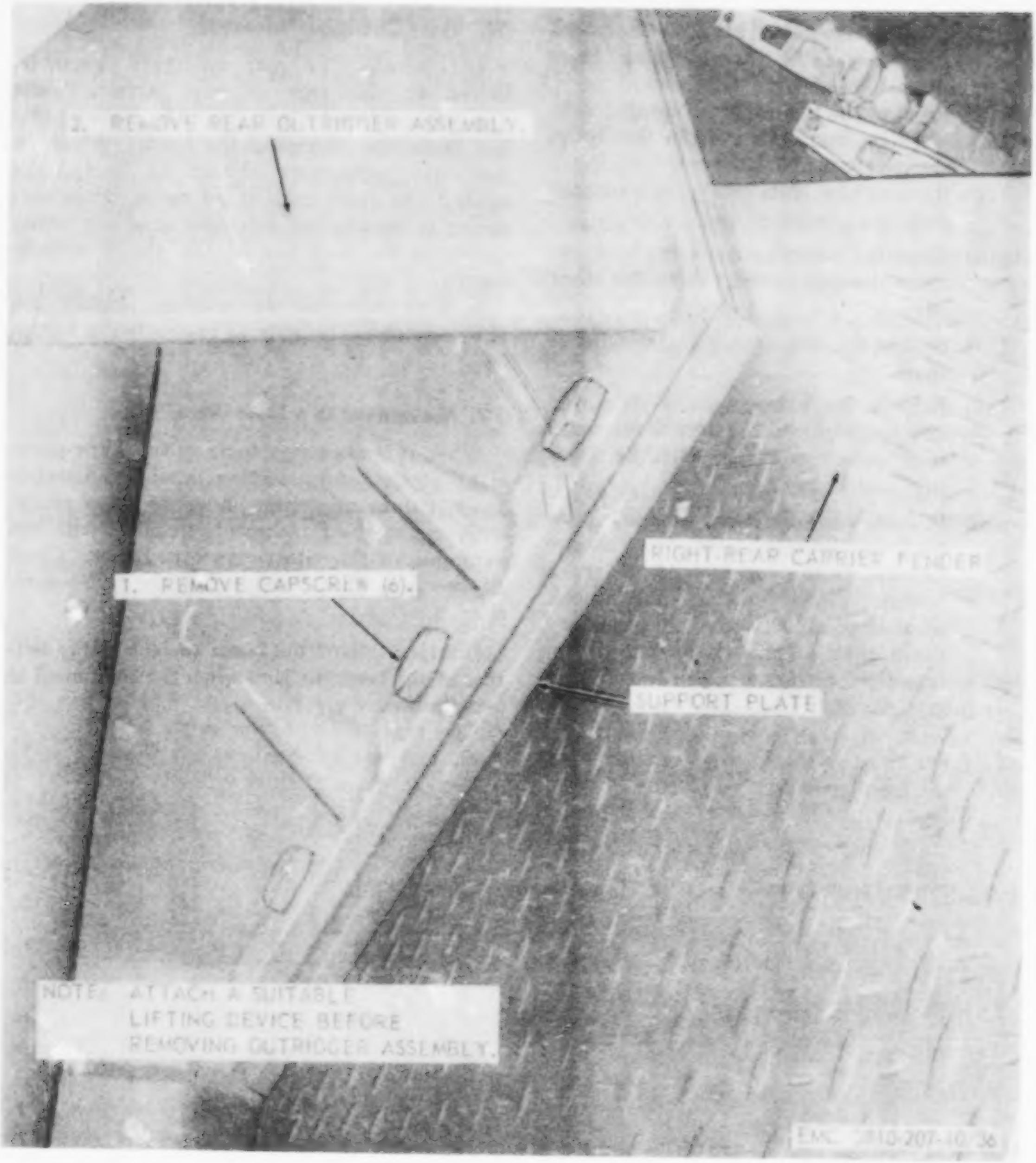
a. General. The rear outrigger assembly, bolted to the rear of the carrier, keeps the crane-shovel from tipping when lifting loads and swinging the boom. When in use, the jackscrews should be held tight against the float pads at all times. It is necessary to remove the outrigger assembly when operating the back hoe or the shovel attachments.

b. Rear Outrigger Installation. Install the rear outrigger assembly as instructed in figure 36.

19. Movement to a New Work Site

When it is necessary to move the crane-shovel to another duty station a short distance away, it may be driven under its own power with any of the attachments installed with the exception of the piledriving attachment. Close all openings when transporting the crane-shovel.

Caution: **Allow the boom to rest at the bottom of the boom support when the equipment is being moved.**



2. REMOVE REAR OUTRIGGER ASSEMBLY.

1. REMOVE CAPSCREW (6).

NOTE: ATTACH A SUITABLE LIFTING DEVICE BEFORE REMOVING OUTRIGGER ASSEMBLY.

Figure 36. Rear outrigger, removal and installation.

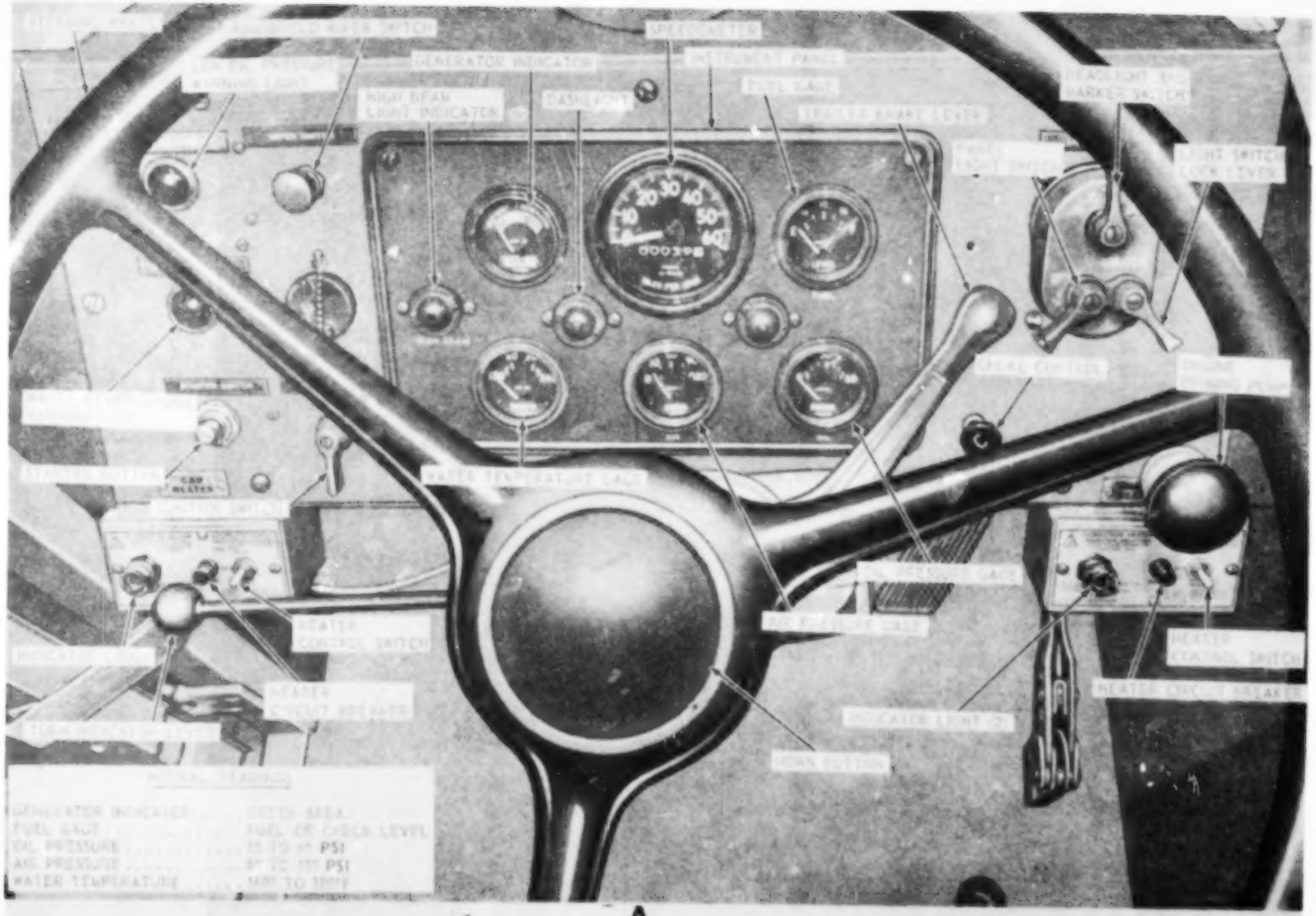
Section II. CARRIER CONTROLS AND INSTRUMENTS

20. General

This section describes, locates, illustrates, and furnishes the operator, crew, or driver sufficient information about the various controls and instruments for proper operation of the crane carrier.

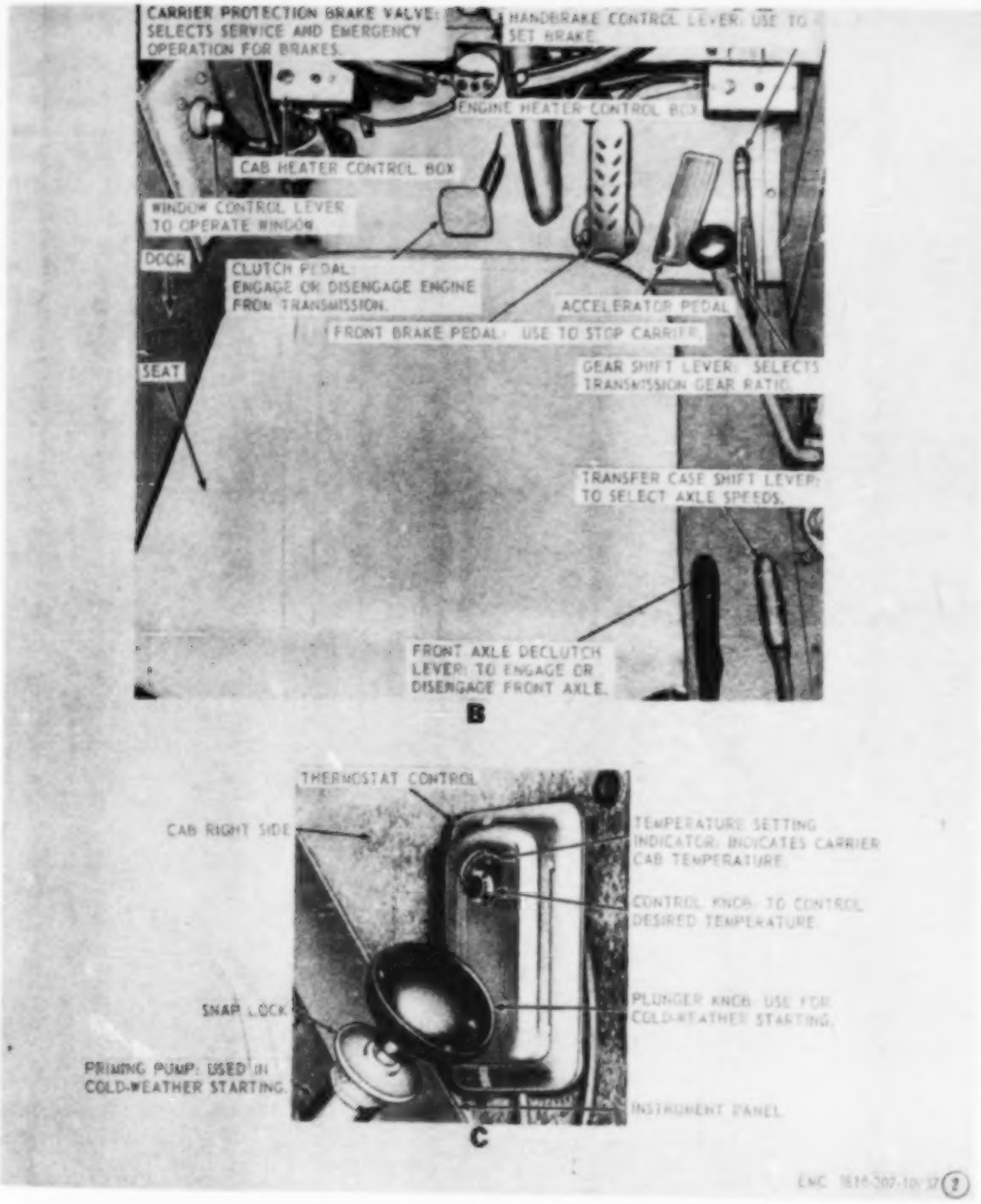
21. Carrier Controls and Instruments

The purpose and location of the controls and the purpose, location, and normal readings of the instruments are illustrated in figure 37.



A. Carrier instrument panel

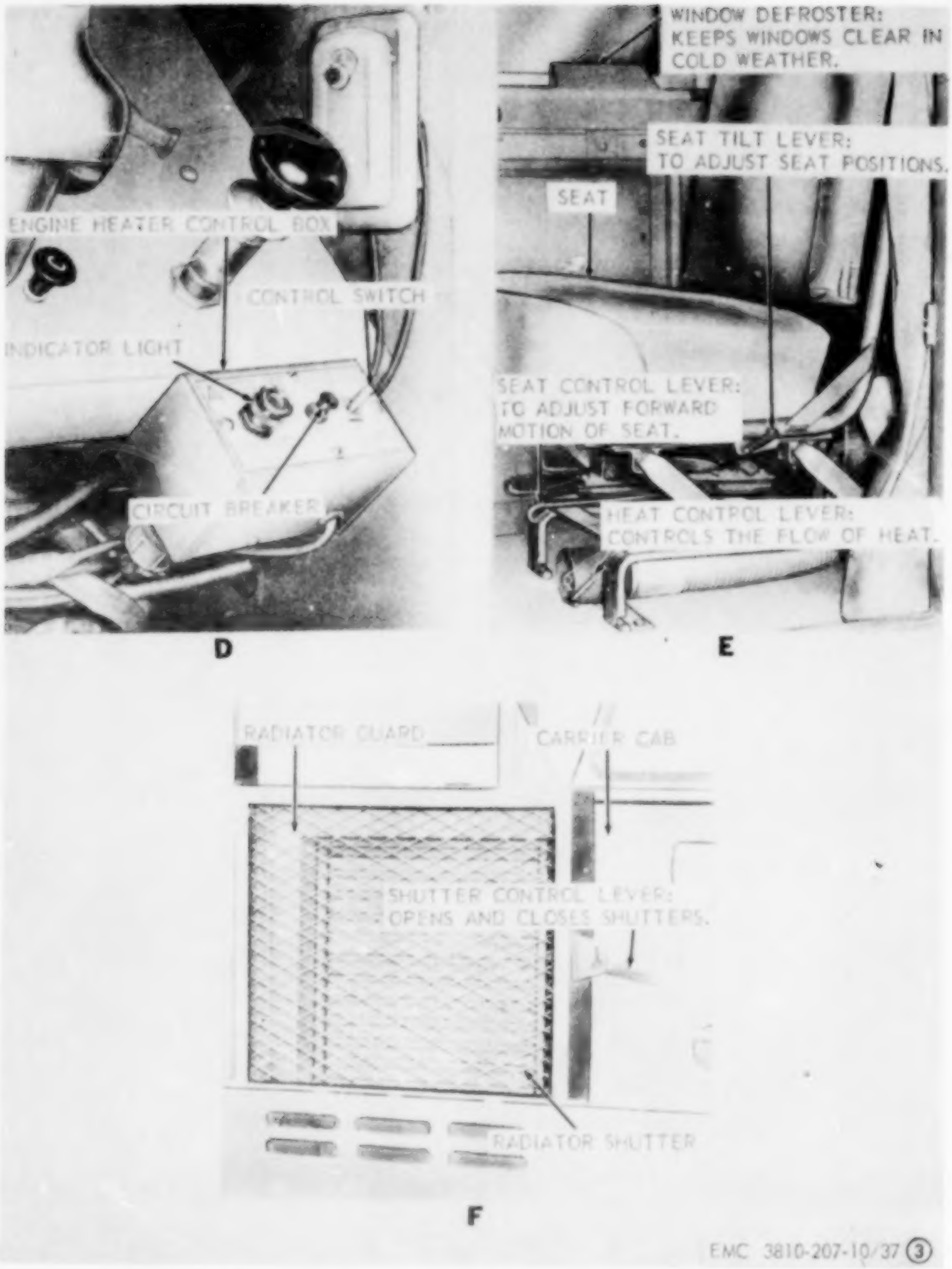
Figure 37. Carrier instruments and controls.


CARRIER PROTECTION BRAKE VALVE: SELECTS SERVICE AND EMERGENCY OPERATION FOR BRAKES.
HANDBRAKE CONTROL LEVER: USE TO SET BRAKE.
ENGINE HEATER-CONTROL BOX
CAB HEATER CONTROL BOX
WINDOW CONTROL LEVER TO OPERATE WINDOW
DOOR
CLUTCH PEDAL: ENGAGE OR DISENGAGE ENGINE FROM TRANSMISSION.
ACCELERATOR PEDAL
FRONT BRAKE PEDAL: USE TO STOP CARRIER.
GEAR SHIFT LEVER: SELECTS TRANSMISSION GEAR RATIO.
SEAT
TRANSFER CASE SHIFT LEVER: TO SELECT AXLE SPEEDS.
FRONT AXLE DECLUTCH LEVER: TO ENGAGE OR DISENGAGE FRONT AXLE.
B
THERMOSTAT CONTROL
CAB RIGHT SIDE
TEMPERATURE SETTING INDICATOR: INDICATES CARRIER CAB TEMPERATURE.
CONTROL KNOB: TO CONTROL DESIRED TEMPERATURE.
SNAP LOCK
PLUNGER KNOB: USE FOR COLD-WEATHER STARTING.
PRIMING PUMP: USED IN COLD-WEATHER STARTING.
INSTRUMENT PANEL
C
EMC 3810-207-10/37 ②

B. Carrier controls

C. Carrier heater thermostat control and fuel priming pump

Figure 37—Continued.


ENGINE HEATER CONTROL BOX
CONTROL SWITCH
INDICATOR LIGHT
CIRCUIT BREAKER
D
WINDOW DEFROSTER: KEEPS WINDOWS CLEAR IN COLD WEATHER.
SEAT TILT LEVER: TO ADJUST SEAT POSITIONS.
SEAT
SEAT CONTROL LEVER: TO ADJUST FORWARD MOTION OF SEAT.
HEAT CONTROL LEVER: CONTROLS THE FLOW OF HEAT.
E
RADIATOR GUARD
CARRIER CAB
SHUTTER CONTROL LEVER: OPENS AND CLOSES SHUTTERS.
RADIATOR SHUTTER
F
EMC 3810-207-10/37 ③

D. Carrier engine heater control E. Carrier seat adjustment and cab heater controls
F. Carrier radiator shutter control lever
Figure 37—Continued.

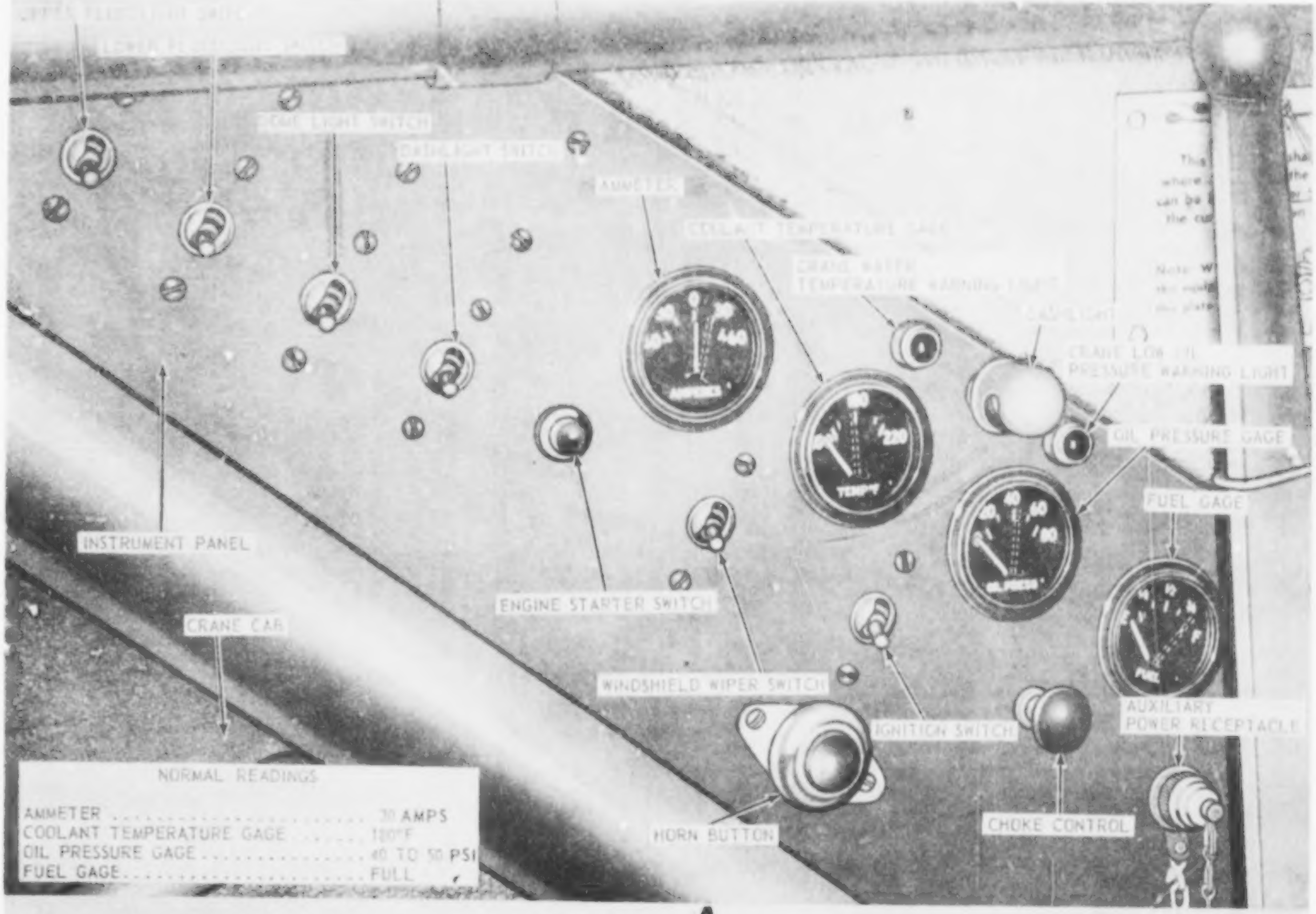
Section III. CRANE-SHOVEL CONTROLS AND INSTRUMENTS

22. General

This section describes, locates, illustrates, and furnishes the operator, crew, or driver sufficient information about the various controls and instruments for proper operation of the crane-shovel.

23. Crane-Shovel Controls and Instruments

The purpose and location of the controls and the purpose, location, and normal readings of the instruments are illustrated in figure 38.

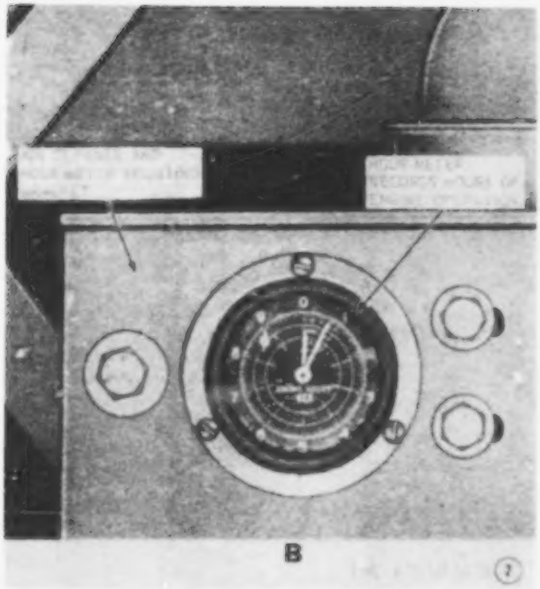


A

EMC 3810-707-10/38 ①

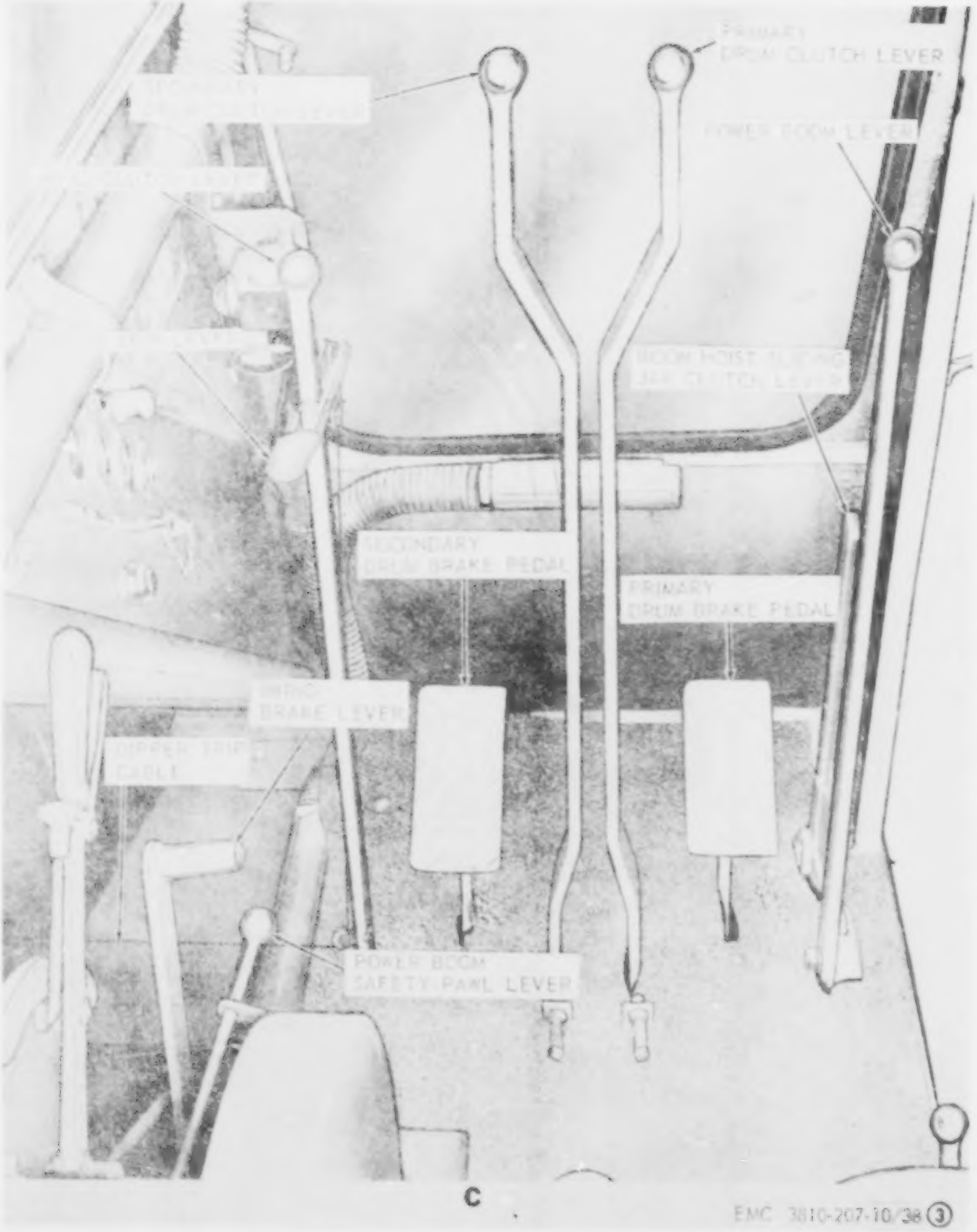
A. Crane instrument panel

Figure 38. Crane instruments and controls.

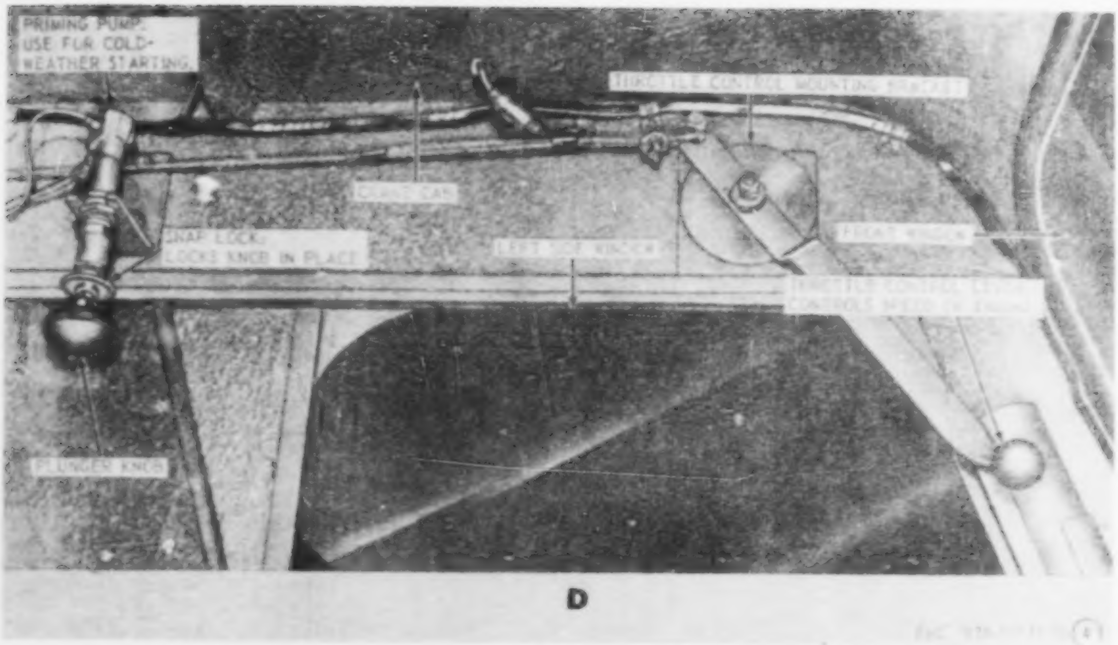


B. Crane hour-meter

Figure 38—Continued.

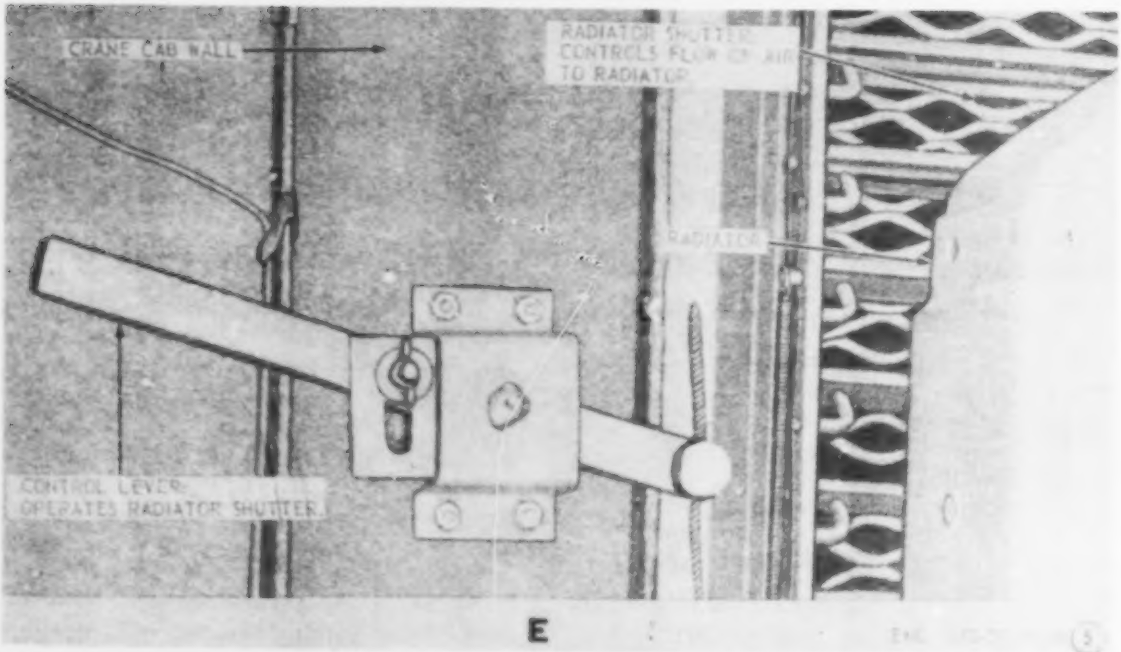


C. Crane controls
Figure 38—Continued.


PRIMING PUMP: USE FOR COLD-WEATHER STARTING
THROTTLE CONTROL MOUNTING BRACKET
CRANE CAB
SNAP LOCK: LOCKS KNOB IN PLACE
LEFT SIDE WINDOW
FRONT WINDOW
THROTTLE CONTROL LEVER: CONTROLS SPEED OF ENGINE
PLUNGER KNOB
D

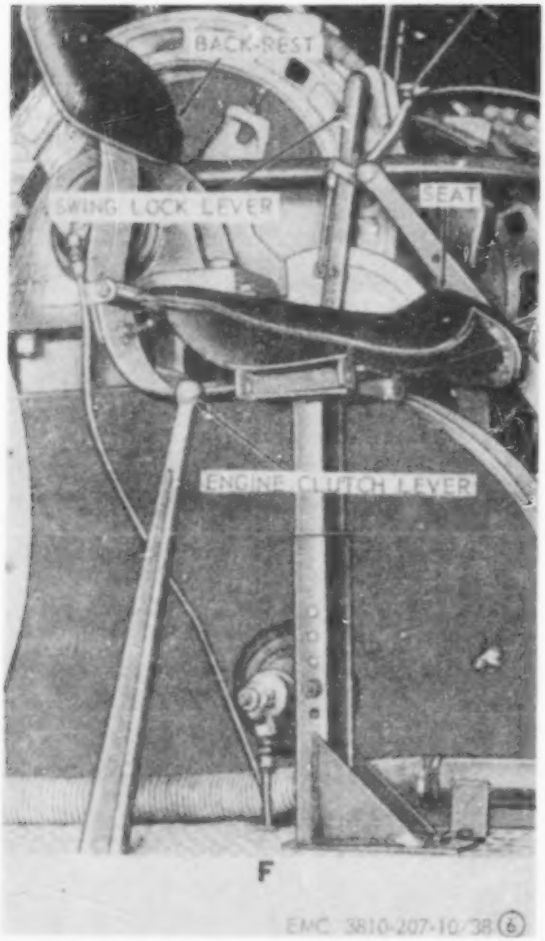
D. Crane engine priming and throttle control lever

Figure 38—Continued.


CRANE CAB WALL
RADIATOR SHUTTER: CONTROLS FLOW OF AIR TO RADIATOR
RADIATOR
CONTROL LEVER: OPERATES RADIATOR SHUTTER
E

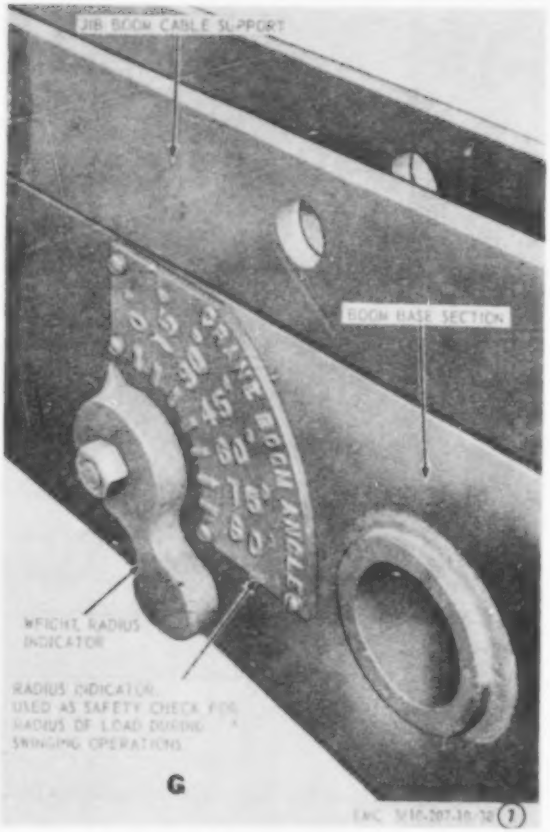
E. Crane radiator shutter control

Figure 38—Continued.



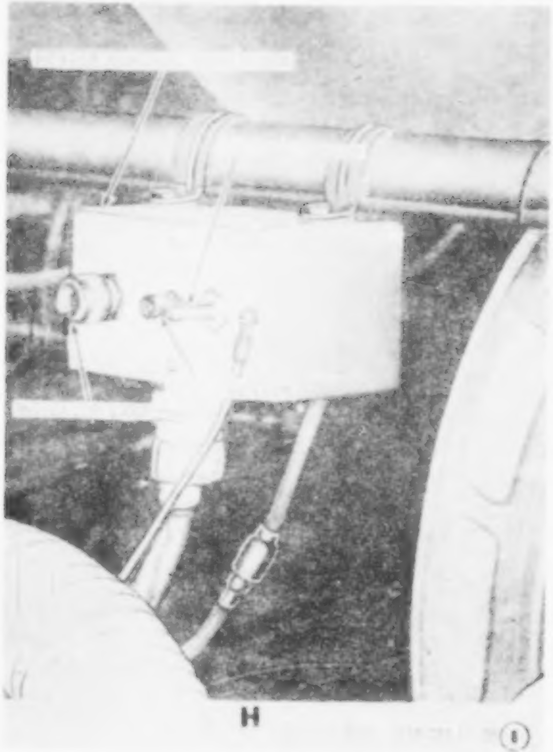
F. Crane control levers and operator's seat

Figure 38—Continued.



G. Crane boom radius indicator

Figure 38—Continued.



H. Crane engine heater control

Figure 38—Continued.

Section IV. OPERATION OF EQUIPMENT

24. General

a. The instructions in this section are published for personnel responsible for operation of the crane.

b. The operator must know how to perform every operation of which the crane is capable. This section gives instructions on starting and stopping the crane, basic motions of the crane, and instructions on coordinating the basic motions to perform the specific tasks for which the equipment is designed. Since nearly every job presents a different problem, the operators may have to vary given procedures to fit the individual job.

25. Starting

a. Preparation for Starting the Carrier Engine.

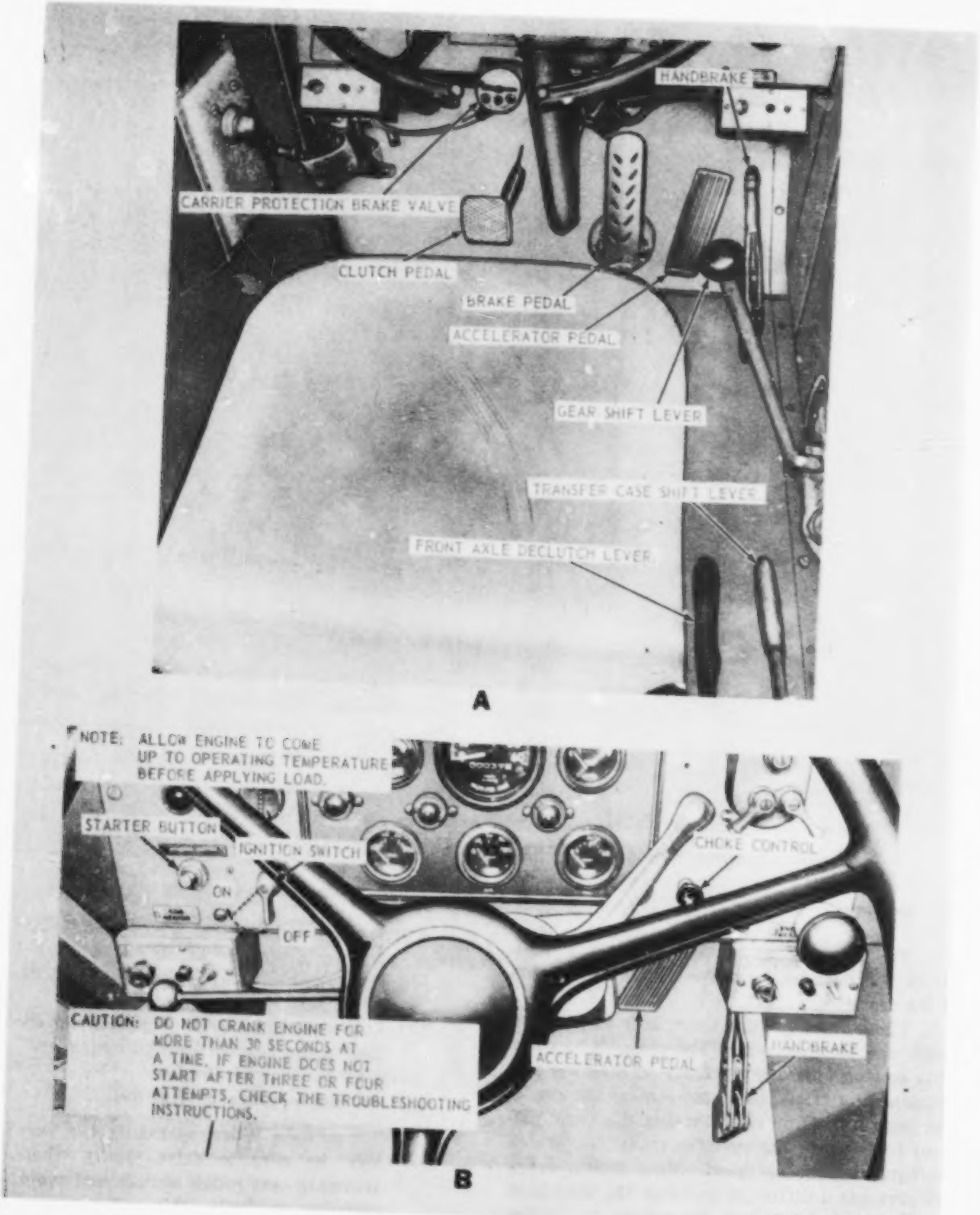
(1) Perform the before-operation services (par. 54).

(2) Lubricate the carrier engine as specified in the current lubrication order.

b. Starting the Carrier Engine.

(1) Set the handbrake (fig. 39).

Caution: **When operating the carrier, be sure to drive slowly when traveling over rough terrain, and avoid stopping suddenly. This will minimize carrier front spring failures.**



NOTE: ALLOW ENGINE TO COME UP TO OPERATING TEMPERATURE BEFORE APPLYING LOAD.

CAUTION: DO NOT CRANK ENGINE FOR MORE THAN 30 SECONDS AT A TIME. IF ENGINE DOES NOT START AFTER THREE OR FOUR ATTEMPTS, CHECK THE TROUBLESHOOTING INSTRUCTIONS.

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A. Carrier controls and levers for starting
B. Carrier controls and instruments used for starting
Figure 39. Starting the carrier engine.

(2) Depress clutch pedal and put gearshift lever in neutral position as shown on shifting diagram.
(3) Keep clutch pedal depressed while cranking motor.
(4) Turn ignition switch to ON position.
(5) Pull choke control all the way out.
(6) Press the accelerator pedal half way down, and press starter button; release starter button as soon as engine starts.
(7) After engine starts, push choke control in until the engine runs smoothly.
(8) Release clutch pedal slowly.
(9) Check all gages for normal operation (fig. 37).

c. Preparation for Starting the Crane Engine.

(1) Perform the before-operation services (par. 54).
(2) Lubricate the crane engine as specified in the current lubrication order.

d. Starting the Crane Engine.

(1) Disengage engine clutch lever by pushing forward (fig. 40).
(2) Make sure drum safety pawl lever is in the locked position.
(3) Place the throttle control lever in FAST IDLE position.
(4) Pull choke control all the way out.
(5) Push the ignition switch up for ON position, and push in on the starter button.
(6) As soon as engine starts, release starter button and adjust throttle control and choke until engine runs smoothly.
(7) Check all gages for normal operation (fig. 38).

Caution: **Should the oil gage indicate a pressure below 7 pounds at 400 to 600 rpm idling speed or greater than 60 pounds at operating speed, stop the engine immediately and investigate the trouble.**

26. Stopping

a. Stopping the Carrier Engine.

(1) Reduce the speed of the engine by letting up on accelerator pedal (fig. 39).
(2) Let engine idle for approximately 5 minutes to allow the engine block and manifold to cool.
(3) Stop the engine by turning the ignition switch to the OFF position.
(4) Perform the after-operation services (par. 54).

b. Stopping the Crane Engine.

(1) Push the throttle control lever (fig. 40) to the CLOSED position and reduce the engine speed to idle for approximately 5 minutes to allow the engine block and manifold to cool.
(2) Stop the engine by pulling down the ignition switch to the OFF position
(3) Make sure all controls are in the neutral positions.
(4) Perform the after-operation services (par. 54).

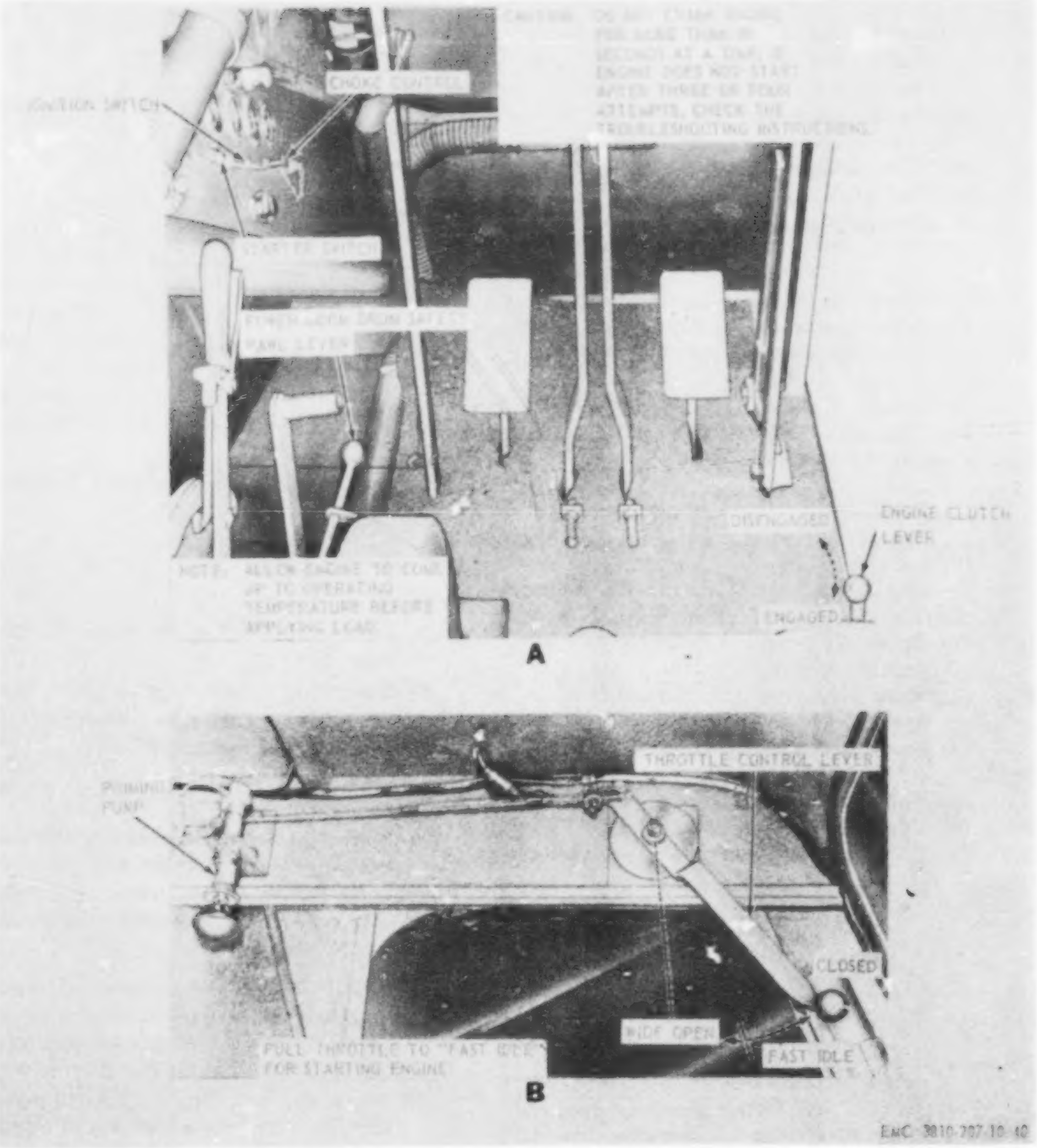
27. Carrier Operation

a. Driving Carrier.

(1) Perform the before-operation services (par. 54).
(2) Start the carrier engine (par. 25).
(3) Operate the carrier as illustrated in figure 41 and instructed below.

b. Forward Motion.

(1) Depress clutch pedal.
(2) Move transfer shift lever into desired range; refer to shifting diagram.
(3) Move the gearshift lever into first speed shown on shifting diagram.
(4) Push handbrake down.
(5) Release clutch pedal slowly; at same time put pressure on accelerator pedal necessary for the engine to overcome the load and put carrier in motion.
(6) As carrier gains speed, release pressure on accelerator pedal and press clutch pedal down. At same time move gearshift lever through neutral and into next higher gear position, 2d.
(7) Push down on accelerator pedal and release clutch pedal as before.
(8) Repeat these operations until transmission is in its highest gear suitable for the condition.


CAUTION: DO NOT CRANK ENGINE FOR MORE THAN 30 SECONDS AT A TIME. IF ENGINE DOES NOT START AFTER THREE OR FOUR ATTEMPTS, CHECK THE TROUBLESHOOTING INSTRUCTIONS.
CHOKE CONTROL
IGNITION SWITCH
STARTER SWITCH
PUSH BOOM DRUM SAFETY PAWL LEVER
DISENGAGED
ENGINE CLUTCH LEVER
NOTE: ALLOW ENGINE TO COME UP TO OPERATING TEMPERATURE BEFORE APPLYING LOAD
ENGAGED
A
THROTTLE CONTROL LEVER
PRIMING PUMP
CLOSED
WIDE OPEN
FAST IDLE
PULL THROTTLE TO "FAST IDLE" FOR STARTING ENGINE
B
EMC 3810-207-10-40

A. Crane lever positions for starting B. Throttle control lever for starting

Figure 40. Starting crane engine.

c. Reverse Motion.

(1) Release pressure on accelerator pedal.

(2) Depress clutch pedal and hold down; at same time apply pressure on brake pedal.

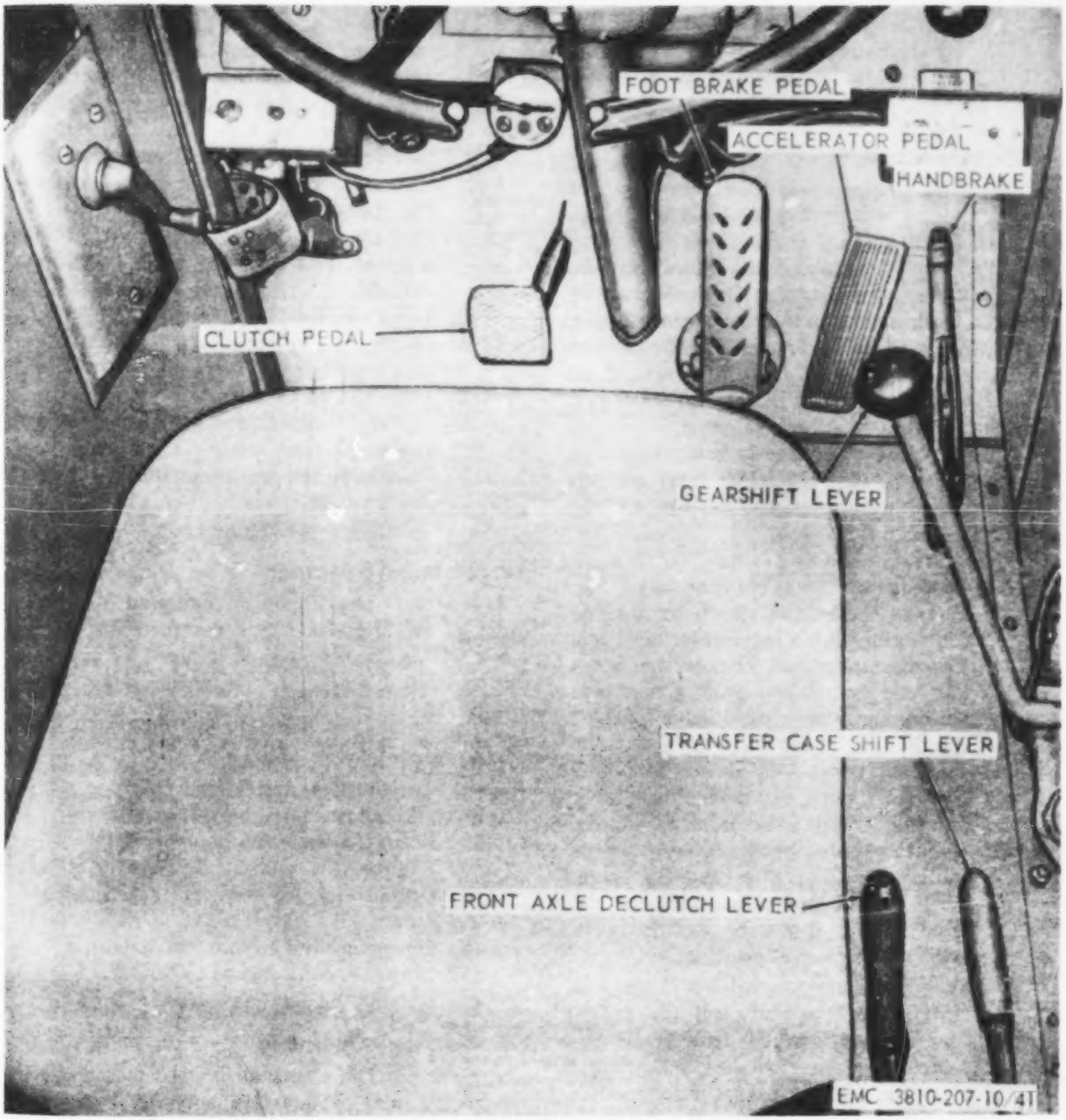


Figure 41. Control positions for carrier operation.

(3) Stop carrier.

(4) With clutch pedal depressed, move gearshift lever through neutral to the right rear in reverse position.

(5) Release clutch pedal slowly; at the same time accelerate the engine in same manner as when moving the carrier forward. Look in intended direction of travel.

(6) Stop the motion of the carrier as instructed in (1) through (3) above.

(7) Disengage clutch pedal and put gearshift lever in the neutral position; apply the handbrake.

Note. Quick application of the brakes may cause damage or injury.

28. Crane Operation

a. General. The crane is used primarily for raising and lowering heavy loads. It is capable of operating through a wide range of conditions. Refer to paragraph 4 and tables I and II.

b. Positioning the Carrier. Back the carrier up to the working site so that the major portion of the work will be performed off the rear of the carrier. Dumping or unloading should be done off the sides. Set the carrier airbrake lock after the working position is selected.

Caution: **When the crane is being operated, the main transmission gearshift lever on carrier should be moved to neutral position and the handbrake set.**

c. Boom Raising and Lowering.

(1) Start the crane engine (par. 25).

(2) Engage the engine clutch by pulling the engine clutch lever (fig. 17) back.

(3) To raise the boom, engage the boom hoist safety pawl by pulling the boom hoist drum safety pawl lever towards the rear of the cab.

(4) Push the boom hoist lever lock forward to unlock the boom hoist lever and engage the jackshaft jaw clutch.

(5) Pull the power boom lever towards the rear of the cab to raise the boom. When the boom has obtained the desired height, push the power boom lever to the neutral position.

(6) To lower the boom, raise it slightly as instructed above and push the safety pawl lever forward to release the safety pawl on the boom hoist drum. Push the power boom lever forward to lower the boom.

(7) When the boom has obtained the desired height, pull the power boom lever back to the neutral position and engage the safety pawl by pulling the power boom drum safety pawl lever towards the rear of the cab.

(8) Operate the crane as instructed in figure 42.

(9) Spotting the load requires accurate control of the hoist and swing movements to locate the load at the exact spot without hunting or overshooting. In event that it is necessary to relocate the carrier, be sure that the swing lock lever is engaged. Practice with the crane controls will soon enable the operator to quickly and accurately pick up a load, raise and swing it into position, and correctly place it where desired.

(10) Lower the load to the ground.

(11) Engage the swing lock with the swing lock lever (fig. 17).

(12) Place the boom hoist safety pawl lever in the engaged position by pulling backward.

(13) Disengage the engine clutch by pushing forward.

(14) Stop the crane engine (par. 26).

29. Jib Boom Operation

a. General. The jib boom, mounted on the pivot of the crane boom, is designed for light work within its capacity. It is used to extend the horizontal reach of the crane when the crane boom is raised to the vertical working position.

b. Operation of Jib Boom.

(1) Position the carrier (par. 28).

(2) Extend the outriggers (par. 8).

(3) Start the crane engine (par. 25).

(4) Engage the engine clutch (fig. 17).

(5) Operate the jib boom as instructed in figure 43.

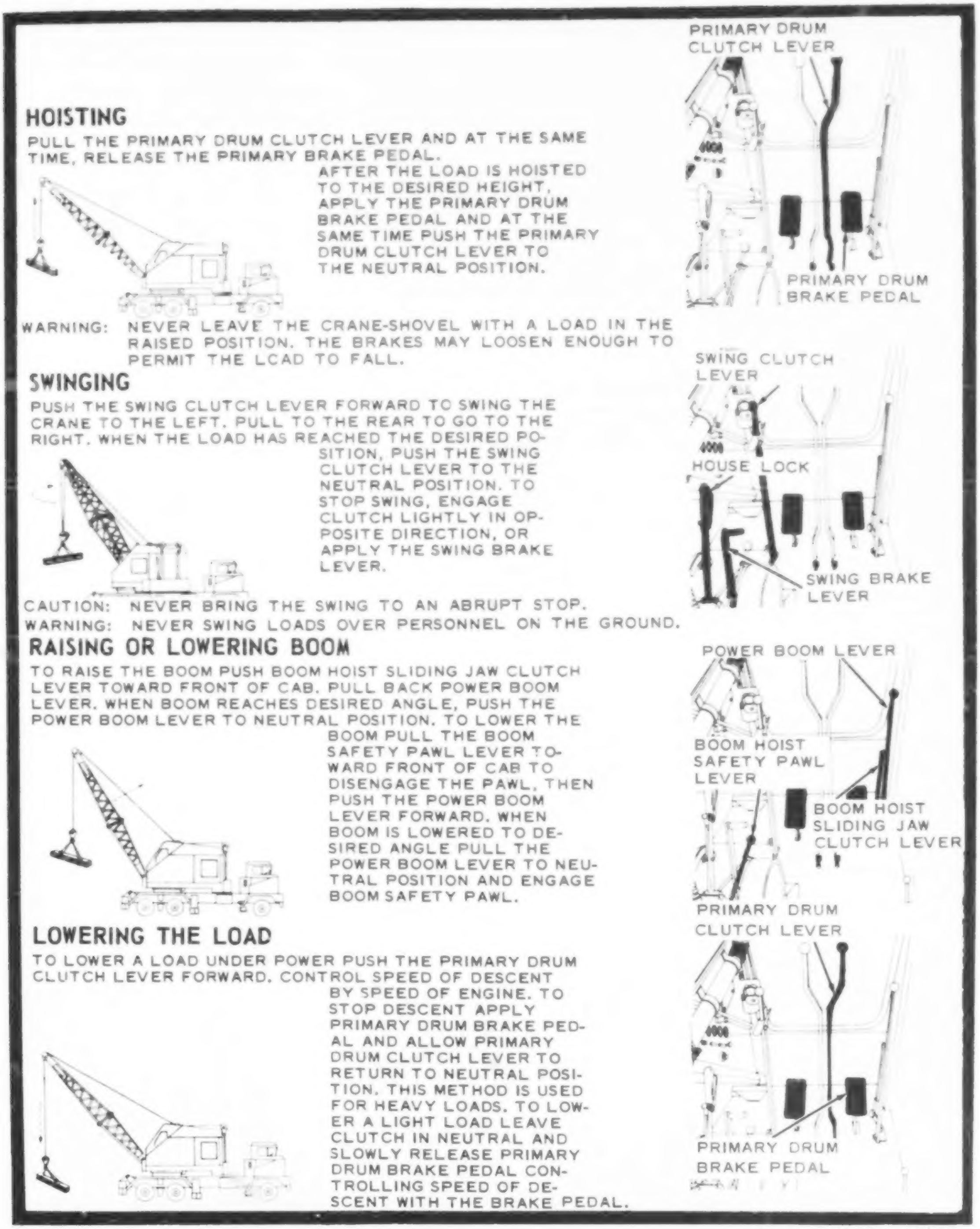
(6) Disengage the engine clutch (fig. 17).

(7) Stop the crane engine (par. 26).

(8) Retract the outriggers (par. 8).

30. Clamshell Operation

a. General. The clamshell is used mostly for excavating in close quarters such as between forms and in narrow ditches and for loading and unloading loose materials from ships and open freight cars. Loads can be accurately dumped at a higher or lower level than would be possible with a shovel. The clamshell bucket is controlled with two cables. The closing cable closes or loads the bucket, and the hoist cable hoists and holds the bucket up while it is being dumped.



HOISTING

PULL THE PRIMARY DRUM CLUTCH LEVER AND AT THE SAME TIME, RELEASE THE PRIMARY BRAKE PEDAL. AFTER THE LOAD IS HOISTED TO THE DESIRED HEIGHT, APPLY THE PRIMARY DRUM BRAKE PEDAL AND AT THE SAME TIME PUSH THE PRIMARY DRUM CLUTCH LEVER TO THE NEUTRAL POSITION.

WARNING: NEVER LEAVE THE CRANE-SHOVEL WITH A LOAD IN THE RAISED POSITION. THE BRAKES MAY LOOSEN ENOUGH TO PERMIT THE LOAD TO FALL.

SWINGING

PUSH THE SWING CLUTCH LEVER FORWARD TO SWING THE CRANE TO THE LEFT. PULL TO THE REAR TO GO TO THE RIGHT. WHEN THE LOAD HAS REACHED THE DESIRED POSITION, PUSH THE SWING CLUTCH LEVER TO THE NEUTRAL POSITION. TO STOP SWING, ENGAGE CLUTCH LIGHTLY IN OPPOSITE DIRECTION, OR APPLY THE SWING BRAKE LEVER.

CAUTION: NEVER BRING THE SWING TO AN ABRUPT STOP.

WARNING: NEVER SWING LOADS OVER PERSONNEL ON THE GROUND.

RAISING OR LOWERING BOOM

TO RAISE THE BOOM PUSH BOOM HOIST SLIDING JAW CLUTCH LEVER TOWARD FRONT OF CAB. PULL BACK POWER BOOM LEVER. WHEN BOOM REACHES DESIRED ANGLE, PUSH THE POWER BOOM LEVER TO NEUTRAL POSITION. TO LOWER THE BOOM PULL THE BOOM SAFETY PAWL LEVER TOWARD FRONT OF CAB TO DISENGAGE THE PAWL, THEN PUSH THE POWER BOOM LEVER FORWARD. WHEN BOOM IS LOWERED TO DESIRED ANGLE PULL THE POWER BOOM LEVER TO NEUTRAL POSITION AND ENGAGE BOOM SAFETY PAWL.

LOWERING THE LOAD

TO LOWER A LOAD UNDER POWER PUSH THE PRIMARY DRUM CLUTCH LEVER FORWARD. CONTROL SPEED OF DESCENT BY SPEED OF ENGINE. TO STOP DESCENT APPLY PRIMARY DRUM BRAKE PEDAL AND ALLOW PRIMARY DRUM CLUTCH LEVER TO RETURN TO NEUTRAL POSITION. THIS METHOD IS USED FOR HEAVY LOADS. TO LOWER A LIGHT LOAD LEAVE CLUTCH IN NEUTRAL AND SLOWLY RELEASE PRIMARY DRUM BRAKE PEDAL CONTROLLING SPEED OF DESCENT WITH THE BRAKE PEDAL.

PRIMARY DRUM CLUTCH LEVER
PRIMARY DRUM BRAKE PEDAL
SWING CLUTCH LEVER
HOUSE LOCK
SWING BRAKE LEVER
POWER BOOM LEVER
BOOM HOIST SAFETY PAWL LEVER
BOOM HOIST SLIDING JAW CLUTCH LEVER
PRIMARY DRUM CLUTCH LEVER
PRIMARY DRUM BRAKE PEDAL

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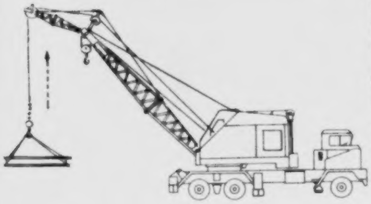
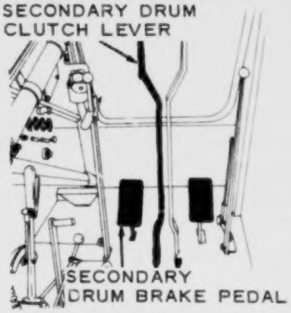
Figure 42. Crane operations and control positions.

HOISTING WITH SECONDARY DRUM

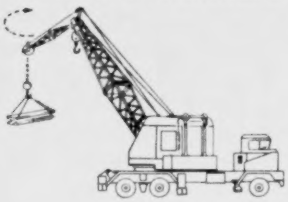
PULL BACK SLOWLY ON THE SECONDARY DRUM CLUTCH LEVER. AT THE SAME TIME, RELEASE PRESSURE ON THE SECONDARY DRUM BRAKE PEDAL. WHEN DESIRED HEIGHT IS REACHED PUSH SECONDARY CLUTCH LEVER TO NEUTRAL AND AT SAME TIME APPLY SECONDARY DRUM BRAKE PEDAL. THESE INSTRUCTIONS ALSO APPLY IF SECONDARY DRUM IS USED ON CRANE BOOM WITHOUT THE JIB.

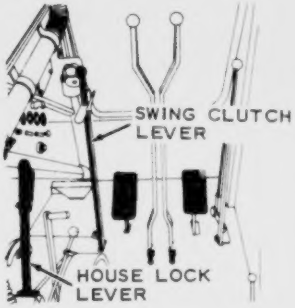




SWINGING

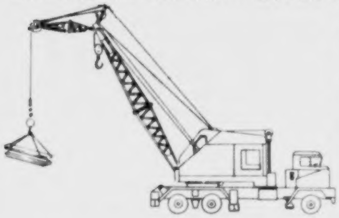
WITH HOUSE LOCK DISENGAGED PUSH THE SWING CLUTCH FORWARD TO SWING LEFT OR PULL TO REAR TO SWING RIGHT. AS LOAD APPROACHES DESIRED POSITION RETURN SWING CLUTCH LEVER TO NEUTRAL TO SLOW OR STOP SWING ENGAGE CLUTCH LIGHTLY IN OPPOSITE DIRECTION. USE EXTREME CARE WHEN SWINGING A LOAD ON THE JIB TO AVOID TIPPING.

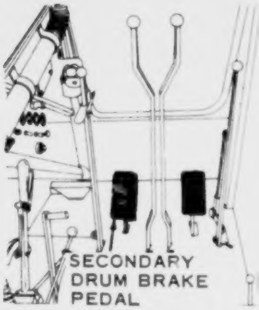




LOWERING THE LOAD

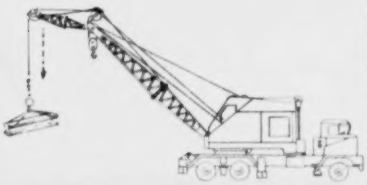
TO LOWER A LOAD RELEASE THE SECONDARY DRUM BRAKE PEDAL SLOWLY AND CONTROL THE SPEED WITH THE BRAKE. WHEN NEAR CAPACITY LOADS ARE ANTICIPATED WITH A JIB, THE JIB HOIST LINE CAN BE REAVED ON THE PRIMARY DRUM TO ASSURE SAFE LOWERING UNDER ENGINE POWER. USE SAME PROCEDURE AS OUTLINED FOR BASIC CRANE. TO RAISE OR LOWER MAIN BOOM USE SAME PROCEDURE AS OUTLINED FOR BASIC CRANE.





BACKING DOWN A LOAD

DISENGAGE THE CRANE CLUTCH AND PULL BOTH PRIMARY AND SECONDARY DRUM CLUTCH LEVERS INTO THE OVER CENTER LOCKED ENGAGED POSITION. THIS LOCKS BOTH HOISTING DRUMS TO THE MAIN HOIST SHAFT ENABLING OPERATOR TO LOWER A LOAD ON EITHER DRUM UNDER CONTROL BY BOTH PRIMARY AND SECONDARY DRUM BRAKE PEDALS. WHEN LOWERING A LOAD IN THIS MANNER MAKE SURE HOUSE LOCK AND SWING BRAKE ARE ENGAGED.



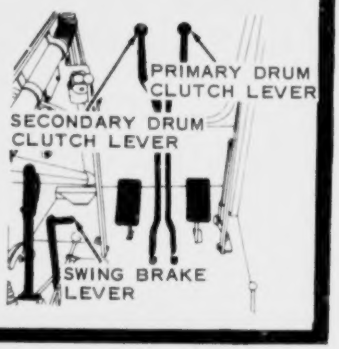


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Figure 43. Jib boom operation and control positions.

b. Operation of Clamshell.

(1) Position the carrier (par. 28*b*).
(2) Start the crane engine (par. 25).
(3) Engage the engine clutch (fig. 17).
(4) Swing the bucket over the material being moved (par. 28).
(5) Operate the clamshell bucket as instructed in figure 44.
(6) Close the bucket and repeat the above working cycle as often as necessary.
(7) Engage the swing lock with the swing lock lever (fig. 17).
(8) Disengage the engine clutch lever (fig. 17).
(9) Stop the crane engine (par. 26).

31. Dragline Operation

a. General. The dragline is used where the material to be worked is soft, muddy, sticky, or medium hard; where the loading and dumping points are far apart both horizontally and vertically; where digging is below machine-level; and where the material must be dumped accurately and as far as possible from the machine. The dragline is used for digging canals, trenches, and levees and for making embankments.

b. Operation of Dragline.

(1) Position the carrier (par. 28*b*).
(2) Extend the outriggers (par. 8).
(3) Start the crane engine (par. 25).
(4) Engage the engine clutch lever (fig. 17).
(5) Operate the dragline as instructed in figure 45.
(6) Disengage the engine clutch (fig. 17)
(7) Stop the crane engine (par. 26).
(8) Retract the outriggers (par. 8).

32. Back Hoe Operation

a. General. The back hoe is used when the material being worked is either soft or hard, when digging is below machine level, and when the area to be worked is relatively small and requires the movement of a minimum amount of material. The back hoe is used in preference to the dragline when speed is necessary and when vertical walls are required in the excavation.

b. Operation of Back Hoe.

(1) Position the carrier (par. 28*b*).
(2) Remove the rear outrigger (par. 18).
(3) Start the crane engine (par. 25).
(4) Engage the engine clutch (fig. 17).
(5) Raise boom mast.
(6) Operate the back hoe as instructed in figure 46.
(7) Lower the bucket and dipper to the ground, push down the primary and secondary drum brake pedals, and disengage the engine clutch (fig. 17).
(8) Stop the engine (par. 26).
(9) When back hoe operation is discontinued, install the rear outriggers (par. 18).

33. Shovel Operation

a. General. The shovel is used where the material being dug is firm or hard, where the digging and dumping points are not too far apart, when accurate dumping is required, and when the dumping point is on about the same level as the machine. The shovel works best when the area being worked is large enough to allow operation at its maximum working ranges.

b. Operation of Shovel.

(1) Position the carrier (par. 28).
(2) Remove the rear outriggers (par. 18).
(3) Start the crane engine (par. 25).
(4) Engage the engine clutch (fig. 17).
(5) Raise the boom as instructed in paragraph 28*c*(5).
(6) Operate the shovel as instructed in figure 47.
(7) Lower the dipper and boom to ground; push down on the swing lock lever, lower dipper, and lower boom as instructed in paragraph 28*c*(6).
(8) Disengage the engine clutch (fig. 17).
(9) Stop the crane engine (par. 26).
(10) Install the rear outriggers (par. 18).

34. Piledriver Operation

a. General. The piledriver is used to drive piling. The pile is held in place between the piledriver leads by a followup block which is recessed to go over the lead pile.

b. Operation of Piledriver.

(1) Position the carrier (par. 28).
(2) Start the crane engine (par. 25).
(3) Engage the engine clutch (fig. 17).

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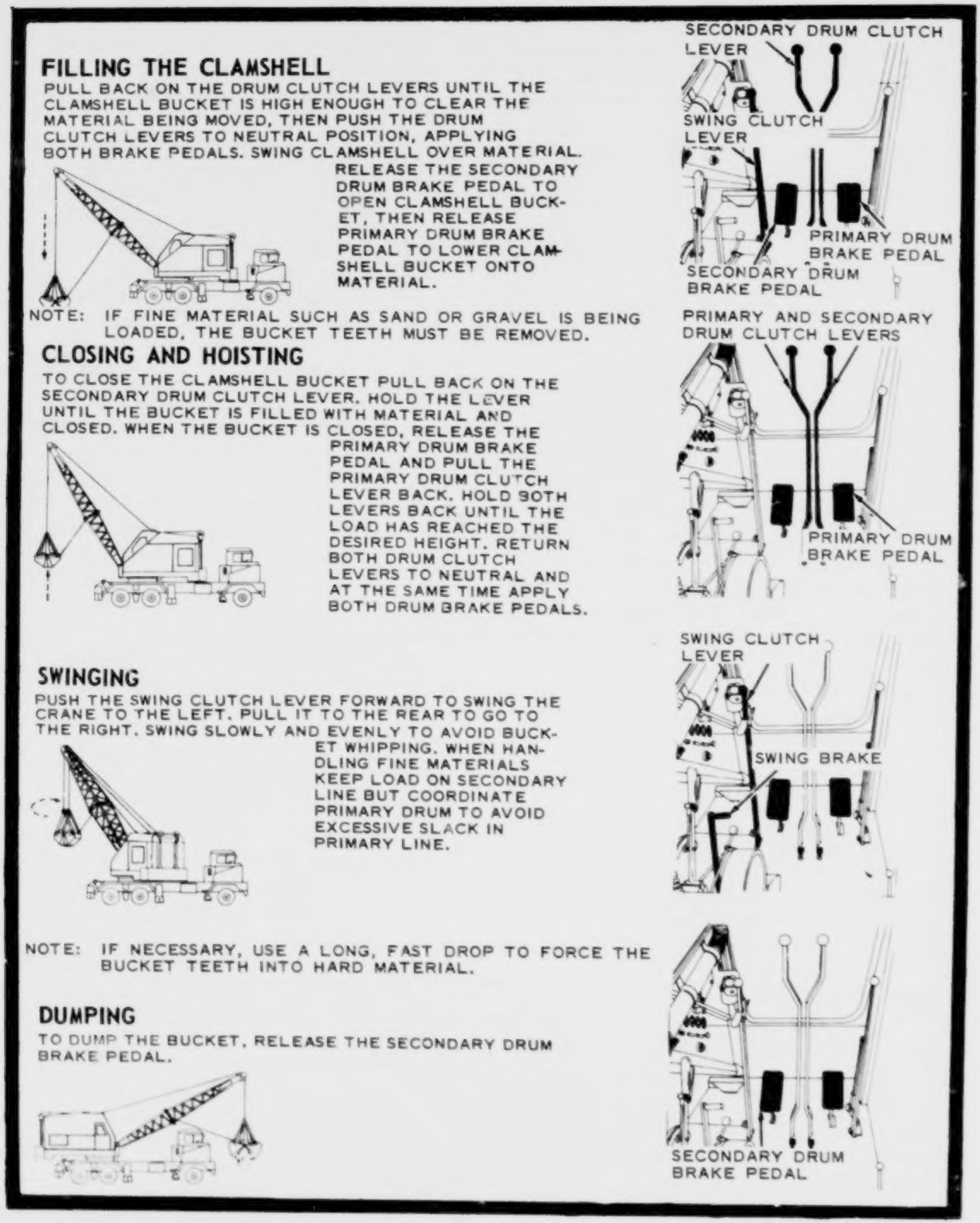


FILLING THE CLAMSHELL

PULL BACK ON THE DRUM CLUTCH LEVERS UNTIL THE CLAMSHELL BUCKET IS HIGH ENOUGH TO CLEAR THE MATERIAL BEING MOVED, THEN PUSH THE DRUM CLUTCH LEVERS TO NEUTRAL POSITION, APPLYING BOTH BRAKE PEDALS. SWING CLAMSHELL OVER MATERIAL. RELEASE THE SECONDARY DRUM BRAKE PEDAL TO OPEN CLAMSHELL BUCKET, THEN RELEASE PRIMARY DRUM BRAKE PEDAL TO LOWER CLAMSHELL BUCKET ONTO MATERIAL.

NOTE: IF FINE MATERIAL SUCH AS SAND OR GRAVEL IS BEING LOADED, THE BUCKET TEETH MUST BE REMOVED.

CLOSING AND HOISTING

TO CLOSE THE CLAMSHELL BUCKET PULL BACK ON THE SECONDARY DRUM CLUTCH LEVER. HOLD THE LEVER UNTIL THE BUCKET IS FILLED WITH MATERIAL AND CLOSED. WHEN THE BUCKET IS CLOSED, RELEASE THE PRIMARY DRUM BRAKE PEDAL AND PULL THE PRIMARY DRUM CLUTCH LEVER BACK. HOLD BOTH LEVERS BACK UNTIL THE LOAD HAS REACHED THE DESIRED HEIGHT. RETURN BOTH DRUM CLUTCH LEVERS TO NEUTRAL AND AT THE SAME TIME APPLY BOTH DRUM BRAKE PEDALS.

SWINGING

PUSH THE SWING CLUTCH LEVER FORWARD TO SWING THE CRANE TO THE LEFT. PULL IT TO THE REAR TO GO TO THE RIGHT. SWING SLOWLY AND EVENLY TO AVOID BUCKET WHIPPING. WHEN HANDLING FINE MATERIALS KEEP LOAD ON SECONDARY LINE BUT COORDINATE PRIMARY DRUM TO AVOID EXCESSIVE SLACK IN PRIMARY LINE.

NOTE: IF NECESSARY, USE A LONG, FAST DROP TO FORCE THE BUCKET TEETH INTO HARD MATERIAL.

DUMPING

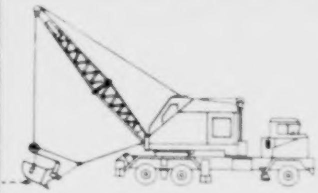
TO DUMP THE BUCKET, RELEASE THE SECONDARY DRUM BRAKE PEDAL.

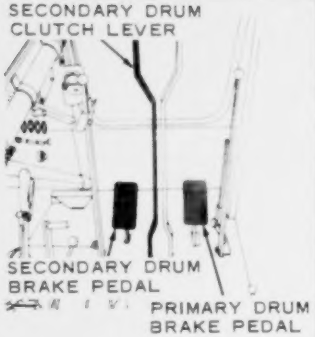
SECONDARY DRUM CLUTCH LEVER
SWING CLUTCH LEVER
PRIMARY DRUM BRAKE PEDAL
SECONDARY DRUM BRAKE PEDAL
PRIMARY AND SECONDARY DRUM CLUTCH LEVERS
PRIMARY DRUM BRAKE PEDAL
SWING CLUTCH LEVER
SWING BRAKE
SECONDARY DRUM BRAKE PEDAL
EMC 3810-207-10/44

Figure 44. Clamshell operation and control positions.

FILLING THE BUCKET

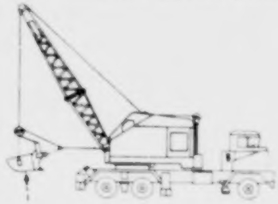
PULL THE SECONDARY DRUM CLUTCH LEVER AND EASE OFF ON THE PRIMARY DRUM BRAKE PEDAL JUST ENOUGH FOR THE HOIST CABLE TO RUN SLACK AND FREE THE BUCKET TO DIG. WHEN BUCKET IS FULL RELEASE SECONDARY DRUM CLUTCH LEVER AND APPLY SECONDARY DRUM BRAKE PEDAL.

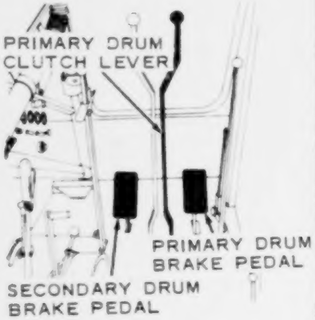




HOISTING

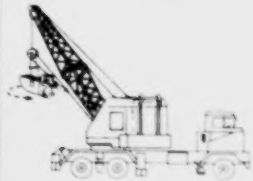
RELEASE PRIMARY DRUM BRAKE PEDAL AND PULL PRIMARY DRUM CLUTCH LEVER BACK. WHILE HOISTING WITH PRIMARY DRUM EASE OFF ON SECONDARY BRAKE PEDAL. PAY OUT ENOUGH CABLE TO KEEP THE BUCKET LEVEL, TO PREVENT SPILLING MATERIAL. WHEN THE BUCKET REACHES DESIRED HEIGHT PUSH PRIMARY DRUM CLUTCH LEVER TO NEUTRAL AND AT THE SAME TIME APPLY BOTH BRAKE PEDALS TO HOLD MATERIAL IN BUCKET WHILE SWINGING.

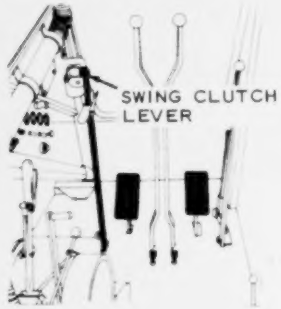




SWINGING THE LOAD

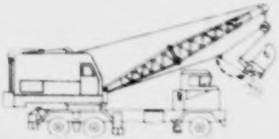
AS THE BUCKET IS RAISED, PULL OR PUSH SWING CLUTCH LEVER TO MOVE BUCKET TOWARD DUMP PILE OR HAULING VEHICLE. AN OPERATOR JUST BEGINNING TO LEARN DRAG BUCKET OPERATION WILL CONCENTRATE ON COORDINATING HOISTING, SWINGING, AND MANIPULATING BOTH BRAKE PEDALS AT THE SAME TIME, FOR MAXIMUM PRODUCTION.





DUMPING THE LOAD

DUMP THE BUCKET BY RELEASING THE SECONDARY DRUM BRAKE PEDAL. USE EXTREME CARE WHEN DUMPING CLOSE TO PERSONNEL OR INTO A HAULING VEHICLE.



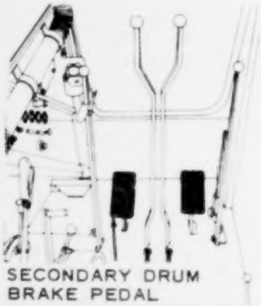


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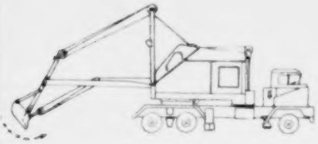
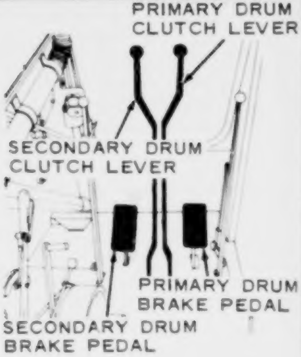
Figure 45. Dragline operation and control positions.

LOADING THE DIPPER

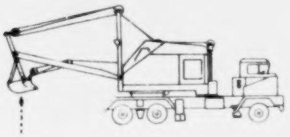
RELEASE PRIMARY DRUM BRAKE PEDAL AND PULL BACK ON PRIMARY DRUM CLUTCH LEVER, AT THE SAME TIME RELEASING THE SECONDARY DRUM BRAKE PEDAL. WHEN THE DIPPER HAS BEEN FULLY EXTENDED RELEASE PRESSURE ON THE PRIMARY DRUM BRAKE PEDAL ALLOWING THE DIPPER TO SETTLE TO THE GROUND. TO FILL DIPPER PULL THE SECONDARY DRUM CLUTCH LEVER, EASE OFF ON THE PRIMARY DRUM BRAKE PEDAL, OR PULL LIGHTLY ON PRIMARY DRUM CLUTCH LEVER AS REQUIRED TO REGULATE DEPTH OF CUT. WHEN DIPPER IS APPROACHING HOE BOOM, RELEASE SECONDARY CLUTCH LEVER AND APPLY SECONDARY BRAKE PEDAL.

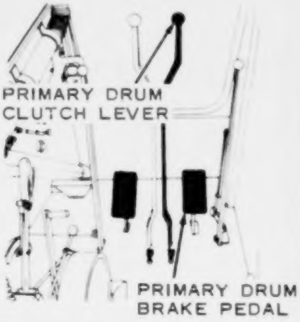



PRIMARY DRUM CLUTCH LEVER
SECONDARY DRUM CLUTCH LEVER
PRIMARY DRUM BRAKE PEDAL
SECONDARY DRUM BRAKE PEDAL

HOISTING

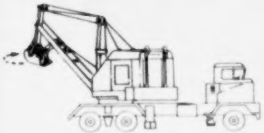
PULL THE PRIMARY DRUM CLUTCH LEVER AND AT THE SAME TIME RELEASE PRESSURE ON THE PRIMARY DRUM BRAKE PEDAL. WHEN DESIRED HEIGHT IS REACHED PUSH PRIMARY DRUM CLUTCH LEVER TO NEUTRAL AND APPLY PRIMARY DRUM BRAKE.

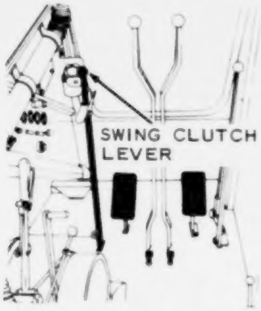




SWINGING

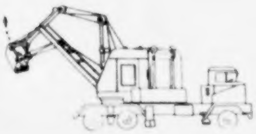
PUSH THE SWING CLUTCH LEVER FORWARD SWINGING CRANE TO LEFT. WHEN DESIRED POSITION IS REACHED, PULL SWING CLUTCH LEVER TO NEUTRAL. TO SWING THE CRANE TO THE RIGHT PULL THE SWING CLUTCH LEVER BACK TOWARD THE OPERATOR. TO SLOW OR STOP SWING APPLY SWING CLUTCH LIGHTLY IN OPPOSITE DIRECTION.





DUMPING THE LOAD

WITH DIPPER IN LINE TO DUMP AT DESIRED LOCATION SLOWLY AND GRADUALLY RELEASE THE SECONDARY DRUM BRAKE PEDAL TO START DUMPING CYCLE. AS DIPPER STARTS TO MOVE OUTWARD PULL PRIMARY DRUM CLUTCH LEVER REELING IN CABLE ON THE PRIMARY DRUM TO KEEP HOE BOOM AT ABOUT THE SAME ANGLE OR IF DUMPING INTO HAULING UNIT ENOUGH TO RAISE BOOM AND KEEP THE DIPPER AT ABOUT THE SAME DISTANCE FROM THE CAB. NEVER RELEASE SECONDARY DRUM QUICKLY OR FULLY WHEN DIPPER IS OFF THE GROUND.



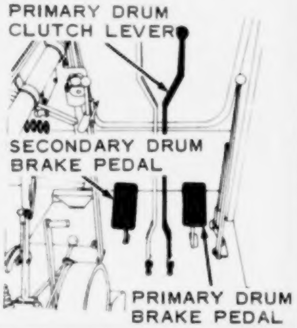


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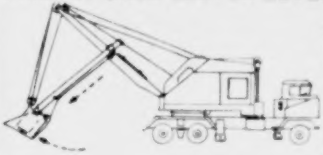
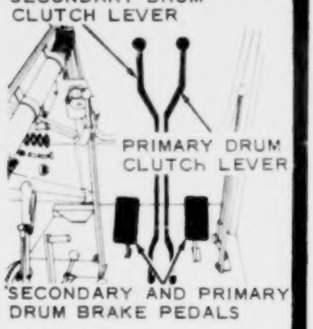
Figure 46. Back hoe operation and control positions.

TO DIG AND CROWD

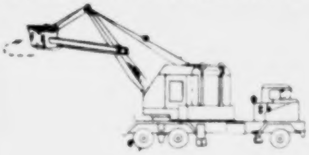
RAISE AND SWING THE DIPPER INTO POSITION. APPLY THE PRIMARY DRUM BRAKE PEDAL AND AT THE SAME TIME, PULL THE SECONDARY DRUM CLUTCH LEVER. SIMULTANEOUSLY, RELEASE SECONDARY DRUM BRAKE PEDAL ALLOWING DIPPER STICK TO SWING DIPPER TOWARD GROUND AND LATCHING DIPPER DOOR CLOSED. AS DIPPER NEARS THE GROUND AND THE CRANE, RELEASE PRIMARY DRUM BRAKE PEDAL AND PUSH PRIMARY DRUM CLUTCH LEVER FORWARD TO CROWD DIPPER INTO GROUND. PULL BACK ON SECONDARY DRUM CLUTCH LEVER TO START DIGGING. MANIPULATE PRIMARY DRUM CLUTCH LEVER, FORWARD TO CROWD AND BACK TO RETRACT DIPPER STICK, AS REQUIRED TO REGULATE DEPTH OF CUT. WHEN DIPPER IS FULL CONTINUE HOISTING WITH SECONDARY DRUM AND SET THE PRIMARY DRUM BRAKE PEDAL. WHEN DIPPER REACHES DESIRED HEIGHT PUSH SECONDARY DRUM CLUTCH LEVER TO NEUTRAL SIMULTANEOUSLY SETTING SECONDARY DRUM BRAKE PEDAL.

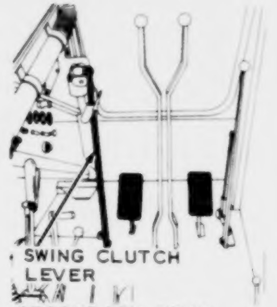



SECONDARY DRUM CLUTCH LEVER
PRIMARY DRUM CLUTCH LEVER
SECONDARY AND PRIMARY DRUM BRAKE PEDALS

SWINGING

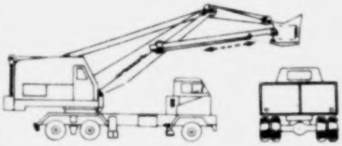
DURING THE SWINGING OPERATION APPLY SWING CLUTCH LEVER, ALINE THE DIPPER WITH THE DUMP POINT BY MOVING THE SWING CLUTCH LEVER FORWARD OR BACK-WARD AS NECESSARY.

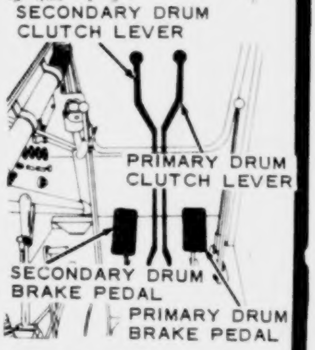




SPOTTING TO DUMP

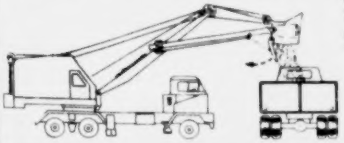
AS THE DIPPER IS CROWDED OUT OR RETRACTED IN BY OPERATING THE PRIMARY DRUM CLUTCH LEVER, RAISE OR LOWER THE DIPPER WITH THE SECONDARY DRUM CONTROLS TO MAINTAIN DESIRED DUMPING HEIGHT.

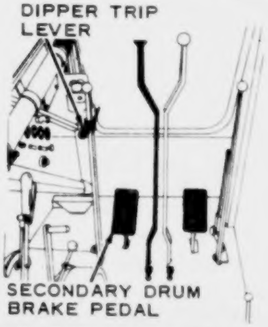



SECONDARY DRUM CLUTCH LEVER
PRIMARY DRUM CLUTCH LEVER
SECONDARY DRUM BRAKE PEDAL
PRIMARY DRUM BRAKE PEDAL

DUMPING

WHEN THE DIPPER IS IN THE DESIRED POSITION, PUSH DOWN ON THE DIPPER TRIP LEVER. AS THE LOAD FALLS, PULL THE SECONDARY DRUM CLUTCH LEVER AND RELEASE THE SECONDARY DRUM BRAKE PEDAL TO RAISE DIPPER. AFTER LOAD IS CLEAR PUSH SECONDARY DRUM CLUTCH LEVER TO NEUTRAL AND APPLY SECONDARY BRAKE RETURN TO START OF CYCLE.





EMC 3810-207-10/47

Figure 47. Shovel operations and control positions.

(4) Raise the boom as instructed in paragraph 28*c*(5).

(5) Operate the piledriver as instructed in figure 48.

(6) After a few short strokes, raise the hammer to the top of the leads. Repeat the piledriver operation cycle as often as necessary.

(7) After the piledriving operation is completed for the day, release the primary drum brake pedal and allow the hammer to fall on the cap. Secure the cap to the hammer with the two cap slings. Pull the primary drum clutch lever and raise the hammer and cap a few feet up in the lead. Release the primary drum clutch lever and apply the primary drum brake pedal.

(8) Swing the crane as instructed in figure 42.

(9) Lay blocking on ground, push the power boom lever forward until the leads touch the block, and pull the power boom lever to the neutral position. Pull back on the boom hoist lever lock. Engage the power boom drum safety pawl lever and swing lock lever.

(10) Release the primary drum brake pedal slowly and allow the hammer and cap to rest on ground. Push down on secondary and primary drum brake pedal and lock.

(11) Disengage the engine clutch (fig. 17).

(12) Stop the engine (par. 26).

35. Operation Under Unusual Conditions

Instructions necessary for the proper functioning of the crane in extreme cold, heat, dusty or sandy areas, under rainy or humid conditions, in salt-water areas, and at high altitudes are given in paragraphs 36 through 41.

36. Operation in Extreme Cold (Below 0° F)

a. Cooling System.

(1) Inspect the cooling system for leaks. Make sure all clamps are tight and draincocks are closed. Protect the cooling system from freezing by adding the amounts of approved ethylene-glycol type antifreeze; procure the required antifreeze through organizational maintenance and fill radiator

(2) Keep the radiator shutters adjusted to maintain normal coolant temperature.

b. Lubrication.

(1) Refer to LO 5–3810–207–20 for special lubricants to use below –10° F. The carrier and the crane are equipped with winterization heaters. The heaters should be operated to heat the engine oil to near operating temperature before engines are started.

(2) Check the oil in all cases frequently, as oil consumption may increase.

(3) Change oil more frequently than usual because of contamination by dilution and sludge formation.

c. Batteries.

(1) Keep the batteries fully charged at all times.

***Caution:* Unless the engines are running or the batteries are immediately charged, do not add water in subzero temperatures.**

(2) Keep all wiring connections and battery terminals tight and free from snow and ice.

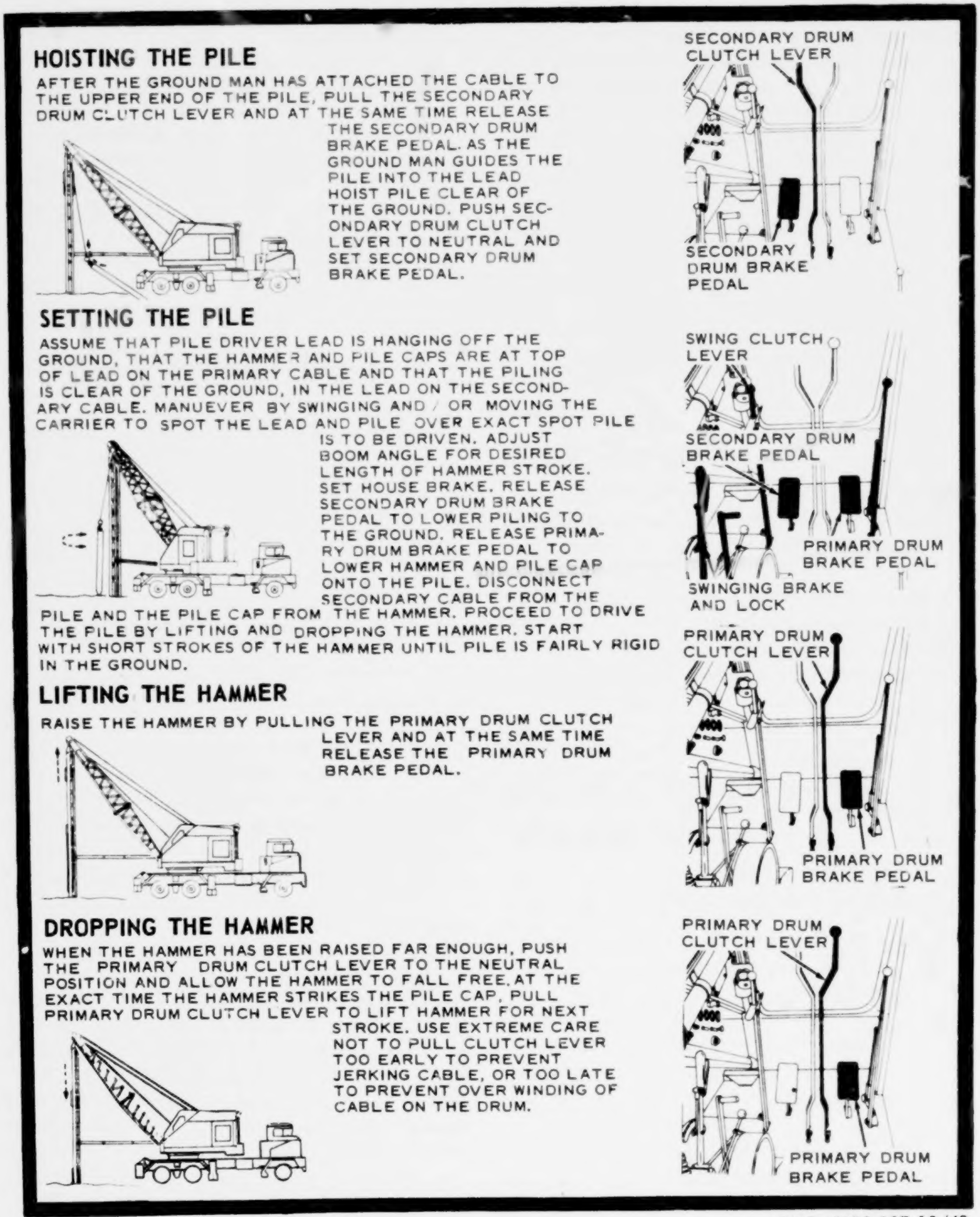
(3) In extremely low temperatures, remove the batteries and place in a heated shelter when not in use.

d. Fuel System. Fuel tanks should be kept as full as possible at all times to minimize condensation. If presence of water is noted in the fuel supply, drain and refill with clean fuel. Drain and service fuel filters and strainers frequently (par. 100 and 101).

e. Brakes.

(1) Do not allow the carrier to stand in mud or water overnight during subzero weather. Position the unit on wood planks.

(2) To prevent brakes from freezing, they should not be applied when the vehicle is parked. Block the wheels to keep the machine from rolling.



HOISTING THE PILE

AFTER THE GROUND MAN HAS ATTACHED THE CABLE TO THE UPPER END OF THE PILE, PULL THE SECONDARY DRUM CLUTCH LEVER AND AT THE SAME TIME RELEASE THE SECONDARY DRUM BRAKE PEDAL. AS THE GROUND MAN GUIDES THE PILE INTO THE LEAD HOIST PILE CLEAR OF THE GROUND. PUSH SECONDARY DRUM CLUTCH LEVER TO NEUTRAL AND SET SECONDARY DRUM BRAKE PEDAL.

SETTING THE PILE

ASSUME THAT PILE DRIVER LEAD IS HANGING OFF THE GROUND, THAT THE HAMMER AND PILE CAPS ARE AT TOP OF LEAD ON THE PRIMARY CABLE AND THAT THE PILING IS CLEAR OF THE GROUND, IN THE LEAD ON THE SECONDARY CABLE. MANUEVER BY SWINGING AND / OR MOVING THE CARRIER TO SPOT THE LEAD AND PILE OVER EXACT SPOT PILE IS TO BE DRIVEN. ADJUST BOOM ANGLE FOR DESIRED LENGTH OF HAMMER STROKE. SET HOUSE BRAKE. RELEASE SECONDARY DRUM BRAKE PEDAL TO LOWER PILING TO THE GROUND. RELEASE PRIMARY DRUM BRAKE PEDAL TO LOWER HAMMER AND PILE CAP ONTO THE PILE. DISCONNECT SECONDARY CABLE FROM THE PILE AND THE PILE CAP FROM THE HAMMER. PROCEED TO DRIVE THE PILE BY LIFTING AND DROPPING THE HAMMER. START WITH SHORT STROKES OF THE HAMMER UNTIL PILE IS FAIRLY RIGID IN THE GROUND.

LIFTING THE HAMMER

RAISE THE HAMMER BY PULLING THE PRIMARY DRUM CLUTCH LEVER AND AT THE SAME TIME RELEASE THE PRIMARY DRUM BRAKE PEDAL.

DROPPING THE HAMMER

WHEN THE HAMMER HAS BEEN RAISED FAR ENOUGH, PUSH THE PRIMARY DRUM CLUTCH LEVER TO THE NEUTRAL POSITION AND ALLOW THE HAMMER TO FALL FREE. AT THE EXACT TIME THE HAMMER STRIKES THE PILE CAP, PULL PRIMARY DRUM CLUTCH LEVER TO LIFT HAMMER FOR NEXT STROKE. USE EXTREME CARE NOT TO PULL CLUTCH LEVER TOO EARLY TO PREVENT JERKING CABLE, OR TOO LATE TO PREVENT OVER WINDING OF CABLE ON THE DRUM.

Figure 48. Piledriver operation and control positions.

f. Controls and Instruments. Due to congealing properties of the lubricants in cold weather, operation of controls may be sluggish when first used. Do not force levers in an attempt to put them in operation. Allow the engine to warm up slowly; this will allow the lubricants to thin.

g. Extreme Cold-Weather Starting of Carrier and Crane Engines.

(1) Before attempting to start the carrier or crane engines in extreme cold weather, operate the carrier and crane engine heaters as instructed in paragraphs 43 through 45 to preheat the engines to a safe starting temperature.

(2) When the engines are sufficiently warm, follow the starting instructions in paragraph 25.

(3) Use the engine primer pump in conjunction with the choke control.

Note. Use the engine primer while the starter button is engaged. Be careful to use it sparingly to avoid flooding engine.

h. Precautions When Operating on Snow or Ice. Take necessary steps to insure a firm footing for the crane. Extend outriggers and use blocking under jack pads to obtain firm footing.

37. Operation in Extreme Heat

a. Cooling System.

(1) Make sure the system is clean and free-flowing.

(2) Keep the coolant level in the radiator as high as possible.

(3) Keep the water pump and its drive well lubricated (LO 5-3810-207-20).

(4) Keep the fan belt adjusted properly. Be sure there is no obstruction of air to the fan.

(5) Keep the radiator fins free of insects, leaves, dirt, and other obstructions.

(6) Drain the cooling system by opening the draincocks on the radiator and the engine block. Flush out system with clean water. Do not use salt or mineral water solutions in system.

(7) If the engine continues to overheat, report the condition to organizational maintenance.

b. Electrical System.

(1) Inspect the wiring for loose connections or deteriorated covering.

(2) Never allow batteries to overheat in service. Guard against this by opening the battery box and allowing air to circulate around the batteries.

(3) Add water to batteries to keep level of the electrolyte one-quarter inch above the plates.

c. Lubrication. Lubricate the crane and carrier with the proper lubricant in accordance with LO 5-3810-207-20.

d. Engines.

(1) Use only the lubricants recommended in the current lubrication order (LO 5-3810-207-20).

(2) Open all sliding panels in the cab to provide as much ventilation for the engines as possible. Also keep radiator shutters open.

(3) Keep the engine clean. Accumulation of dust and oil form an insulation against cooling air from the fan.

38. Operation in Dusty or Sandy Areas

a. Protection. Keep the unit clean and clear of sand or dust, as the sand has the tendency to penetrate into the bearings and bushings. Because of this, the unit must be kept clean and be lubricated more frequently.

b. Fuel Systems. Keep fuel tank filler caps tight to prevent sand or dust from entering fuel tank. Service fuel filters and screens frequently to keep them free of sand and grit.

c. Lubrication. Make sure that all lubrication fittings are clean and clear of sand or grit before lubricating. Lubricate in accordance with LO 5-3810-207-20.

d. Revolving Frame Roller Path. Operating under extreme sandy or dusty conditions will require frequent inspections of the revolving frame roller path. Never allow lubricant to collect on the roller path, as it will collect sand and cause rollers to wear excessively or slide on roller path.

e. Clutches and Brakes. Inspect clutches and brakebands frequently and blow out or wipe off accumulations of sand and dirt. Failure to keep bands clean will result in worn bands, scored drums, and unsatisfactory operation.

f. Cables. Keep all unused cables in boxes. Clean operating cables frequently to prevent excessive cable wear and to insure satisfactory operation.

g. Open Gears and Chains. After operation in dust or sand, blow loose grit out of machinery or wash lubricant and foreign matter from gears and chains, and apply new lubricant. Application of new lubricant is important to prevent wear and maintain satisfactory operation.

h. Air Cleaners. Service the air cleaners more often than under normal conditions.

39. Operation Under Rainy or Humid Conditions

a. General. Prevention of rust and deterioration of electrical insulation in humid or rainy areas require constant exercise of preventive measures.

b. Lubrication. Inspect gearcases, crankcases, and lubrication fittings to see that no water has entered the gearcase or crankcase. If there is water at all in the gearcase or crankcase, drain and refill in accordance with LO 5–3810–207–20.

c. Cooling System.

(1) Make sure the system is clean and free-flowing.

(2) Keep the coolant level in the radiator as high as possible.

(3) Keep the water pump and its drive well lubricated (LO 5–3810–207–20).

(4) Keep the fan belts adjusted properly.

(5) Be sure there is no obstruction of air to the fan.

(6) If the engines become overheated from lack of water, allow them to cool before adding water. Let the engines run at fast idle when adding water.

d. Batteries. Keep the batteries fully charged at all times.

e. Fuel System. Keep the fuel tank filler caps tight to prevent water from entering the fuel tank and fuel containers. Service the fuel tanks frequently to prevent condensation in the tank and lines.

f. Electrical System.

(1) Inspect the wiring for loose connections or deteriorated covering.

(2) Frequent inspection is necessary to find worn spots in the insulation which, unless repaired, allow short-circuit conditions.

40. Operation in Salt-Water Areas

a. General. Prevention of rust and deterioration of electrical insulation in salt-water areas require constant exercise of preventive measures. Although the wiring on the crane-shovel and carrier has been specially treated to resist fungus and rot, frequent inspection is necessary.

b. Protection. Inspect the unit for rust and corrosion. Rust and corroded conditions at any point on the unit must be corrected immediately. Remove all rust, and paint the bare surfaces. Place a light film of lubricant on polished or machined metal surfaces.

***Caution:* Use only clean, fresh water when filling the radiator. Do not use salt or mineral water solutions in the system, except in an emergency.**

c. Fuel System. Keep fuel tank filler caps tight to prevent any salt water from entering the fuel tank and containers. Service the fuel filters and screens frequently.

d. Electrical System. Make sure that all electrical leads are in good condition and not frayed, and that insulation is not torn or broken. Repair any broken insulation as it may lead to a short in the electrical system.

e. Batteries. Check the batteries to make sure they are full of water, that all connections are tight, and that the terminals are greased to prevent any corrosion.

f. Lubrication. Keep parts thoroughly lubricated to prevent entry of water into bearings and polished metal surfaces. Keep lifting cables lubricated as specified in LO 5–3810–207–20.

41. Operation at High Altitude

Operation at high altitude presents operational problems due to lower atmospheric pressure and wide temperature ranges. At altitudes above 5,000 feet it is necessary to adjust carburetors (pars. 102 and 103). Be sure the air cleaner is clean and free of obstructions. Serv- the air cleaners frequently. Maximum performance can be maintained by carefully following the operator's daily services (par. 54).

***Caution:* Check the units frequently for overheating of the engines in high-altitude operation.**

Section V. OPERATION OF AUXILIARY MATERIEL USED IN CONJUNCTION WITH THE CARRIER AND CRANE

42. General

This section covers the description, operation, and maintenance of auxiliary equipment supplied for use with the carrier and crane but not necessary for the basic functioning of the carrier and crane.

43. Carrier Engine Heater

a. Description. The carrier engine heater (fig. 1) is mounted to the rear of the carrier engine housing. For cold-weather operation the gasoline heater provides the carrier engine and related components with sufficient heat to start normal function. An automatic bypass valve operates to deflect heat into the engine housing when the battery box and oil pan reach safe operating temperatures. When additional heat is needed in the battery box and oil pan for safe operation, the valve opens to furnish them with additional heat.

b. Heater Operation.

(1) Position control switch to ON-HI position.

Note. When heater has ignited and is operating satisfactorily, the indicator lamp will glow.

(2) To stop heater, position the control switch to OFF position. The indicator lamp will remain on until heater has purged.

(3) To start carrier cab heater, set thermostat at the desired cab temperature.

(4) Start heater as instructed above. The thermostat will cycle heater at desired temperature.

44. Carrier Cab Personnel Heater

a. Description. The carrier cab personnel heater is mounted to the rear of the carrier operator's cab. The cab heater is thermostatically regulated to assure even cab temperature.

b. Operation. Operate the carrier cab personnel heater in the same manner as the carrier engine heater (par. 43).

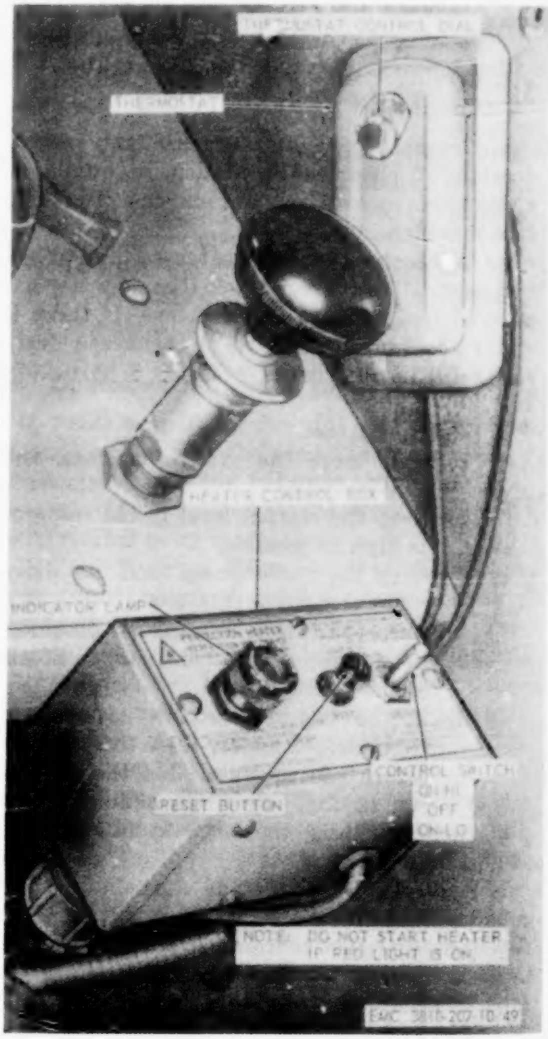


Figure 49. Carrier engine heater operation.

Note. The carrier cab heater is equipped with a thermostat which operates the heater automatically at whichever position the control switch is set, either ON-HI or ON-LO.

45. Crane Engine and Personnel Heater

a. Description. The crane engine and personnel heater is on the revolving frame located just inside the right-rear access door of the crane cab. In cold-operating conditions, the gasoline heater provides the crane engine and related components with sufficient heat to start and function normally. An automatic bypass valve operates to deflect heat out of the heater exhaust pipes when the engine reaches the normal operating temperature range. When additional heat is needed for safe engine operation, the valve opens to furnish the engine with the required additional heat.

b. Operation. Operate the crane engine and personnel heater in the same manner as the carrier engine and personnel heaters (par. 43 and 44).

46. Carrier Fire Extinguisher (Carbon Dioxide Type)

a. Description. The carrier fire extinguisher is mounted on a bracket on the back of the left-front fender. It is the carbon dioxide type fire extinguisher and suitable for electrical and flammable liquid fires.

b. Operation. Remove fire extinguisher from its location; break the seal, operate the control valve, and direct the stream at the base of flame.

c. Maintenance. For maintenance of the fire extinguisher, refer to TM 5-687 and TM 9-1799.

47. Crane Fire Extinguisher (Carbon Dioxide Type)

a. Description. The crane fire extinguisher is mounted on a floor bracket in the interior of the operator's cab, to the rear of the operator's seat. It, like the carrier fire extinguisher, is for electrical and flammable liquid fires.

b. Operation. Refer to paragraph 46 for operation of the crane fire extinguisher.

c. Maintenance. For maintenance of the fire extinguisher, refer to TM 5-687 and TM 9-1799.

48. Fire Extinguisher (Monobromotrifluoromethane Type)

a. Description. The monobromotrifluoromethane type fire extinguisher replaces the carbon dioxide and carbon tetrachloride type fire extinguishers used in the past. It is generally suitable for use on all types of fire, with exception of fires involved with LOX (liquid oxygen) generating equipment. The fire extinguisher is furnished with a disposable type cylinder.

b. Operation. To operate the fire extinguisher, perform the following operations:

(1) Remove fire extinguisher from its location.
(2) Break the seal by pulling the safety pin from the handle.
(3) Point the horn at the base of the flame.
(4) Depress trigger for discharge and direct the stream of contents at the base of the fire.

Warning: **Avoid breathing of smoke.**

(5) Replace with new cylinder immediately after using.

c. Replacement of Cylinder. To replace with new cylinder, perform the following operations:

(1) Press lever to release pressure from old cylinder.
(2) Loosen swivel valve coupling nut and remove the valve assembly from used cylinder.
(3) Remove instruction band from used cylinder.
(4) Place new cylinder through the instruction band.
(5) Replace safety pin in valve and seal pin with seal wire.
(6) Attach valve assembly and tighten swivel coupling nut on the new cylinder and replace fire extinguisher in mounting bracket.
(7) Adjust instruction band on cylinder to show maintenance and operating instructions.

d. Maintenance. Weigh fire extinguisher every six months and replace cylinder if gross weight has decreased 4 ounces or more. Lubricate cylinder neck threads with one drop of OE 30 oil before reassembly.

CHAPTER 3
MAINTENANCE INSTRUCTIONS

Section I. OPERATOR'S TOOLS AND EQUIPMENT

49 Special Tools and Equipment

No special tools or equipment is needed by the operator for the maintenance of this crane.

50. Basic Issue Tools and Equipment

Tools and repair parts issued with or authorized for the crane are listed in appendix II.

Section II. Lubrication

51. General Lubrication Information

a. This section contains a reproduction of the lubrication order and lubrication instructions which are supplemental to, and not specifically covered in, the lubrication order.

b. The lubrication order shown in figure 50 is an exact reproduction of the approved lubrication order for the crane. For current lubrication order, refer to DA Pam 310-4.

52. Detailed Lubrication Information

a. Care of Lubricants. When storing or handling lubricants, make certain the containers are clean and securely covered to prevent dirt, dust, or foreign matter from entering. Be sure the lubricant is clean before using it.

b. Cleaning. Clean all surfaces surrounding the point to be lubricated before applying the lubricant. Use a clean cloth dampened in an approved cleaning solvent to clean the surface before lubricating. Remove all excess lubricant after lubricating.

c. Points of Application. The points of application can be located by referring to LO 5-3810-207-20 (fig. 50) and to the detailed illustrations of the lubrication points. Follow the instructions and apply the lubricant prescribed.

Caution: **Overlubrication may cause equipment failure or damage to working parts.**

d. Special Lubrication Instructions for Unusual Conditions. The intervals will be more frequent when operating the crane during extremely high temperatures, in dust or sand, or under any condition which tends to destroy the protective quality or quantity of the lubricant.

e. OES Oil. The crankcase oil level must be checked frequently as oil consumption may increase. This oil may require changing more frequently that usual because contamination by dilution and sludge formation will increase under cold-weather conditions.

f. Carrier Engine Oil Filter Service. Service the carrier oil filter as instructed in figure 51.

g. Crane Engine Oil Filter Service. Service the crane engine oil filter as instructed in figure 52.

h. Carrier Engine Crankcase Breather Service. Service the carrier engine crankcase breather as instructed in figure 53.

i. Crane Engine Crankcase Breather Service. Service the crane engine crankcase breather as instructed in figure 54.

j. Carrier Engine Air Cleaner Service. Service the carrier engine air cleaner as instructed in figure 55.

k. Crane Engine Air Cleaner Service. Service the crane engine air cleaner as instructed in figure 56.

l. Carrier Engine Air Compressor Breather Service. Service the air compressor breather as instructed in figure 57.

LUBRICATION ORDER

LO 5-3810-207-20-1

8 NOVEMBER 1961 (Supersedes LO 5-3810-207-20, 6 Aug 1959)

CRANE-SHOVEL BASIC UNIT, TRUCK MOUNTED: 20 TON, 3/4 CU YD; GASOLINE DRIVEN, 6X6; AND WINTERIZED TO -65°; (QUICKWAY MODEL M 200) W/ ENGINE CONTINENTAL MODEL BS-415, AND CARRIER ENGINE CONTINENTAL MODEL SS-6749

Reference: TM 5-3810-207-10, -20 and -35 LO 5-3810-207-20-2, -3, -4 and -5 SM 10-1-C4-1

Intervals are based on normal hours of operations. Reduce to compensate for abnormal operations and severe conditions. During inactive periods sufficient lubrication must be performed for adequate preservation.

Clean fittings before lubricating.

Relubricate after washing or fording.

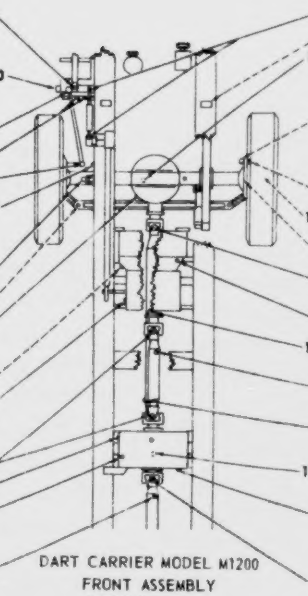
A dotted circle indicates a drain below.

Clean parts with SOLVENT, dry-cleaning, or with OIL, fuel, Diesel. Dry before lubricating.

Lubricate points indicated by dotted arrow shafts on both sides of equipment.

Drain gearcases when hot. Fill and check level.

		LUBRICANT	INTERVAL
1	Steering Gear Housing Fill and Level Plug (See Key.) (Check level.)	GO	250
2	Steering Gear Housing Drain Plug (Drain and refill.)		1000
3	Drag Link	GAA	50
4	Clutch Cross Shaft	GAA	50
5	Drag Link	GAA	50
6	Emergency Brake Cable (Remove plug and install temporary fitting, lubricate, and re-install plug.)	GAA	500
7	Transfer Shift Lever	GAA	50
8	Tie Rod	GAA	50
9	Front Axle Differential Fill and Level Plug (See Key.) (Check level.)	GO	50
10	Clutch Release Shaft	GAA	50
11	Transmission Fill and Level Plug (See Key.) (Check level.)	GO	50
12	Drive Shaft Spider Bearings	GAA	50
13	Speedometer Drive	GAA	50
14	Transfer Case Fill and Level Plug (See Key.) (Check level.)	GO	50
15	Drive Shaft Slip Yoke	GAA	50



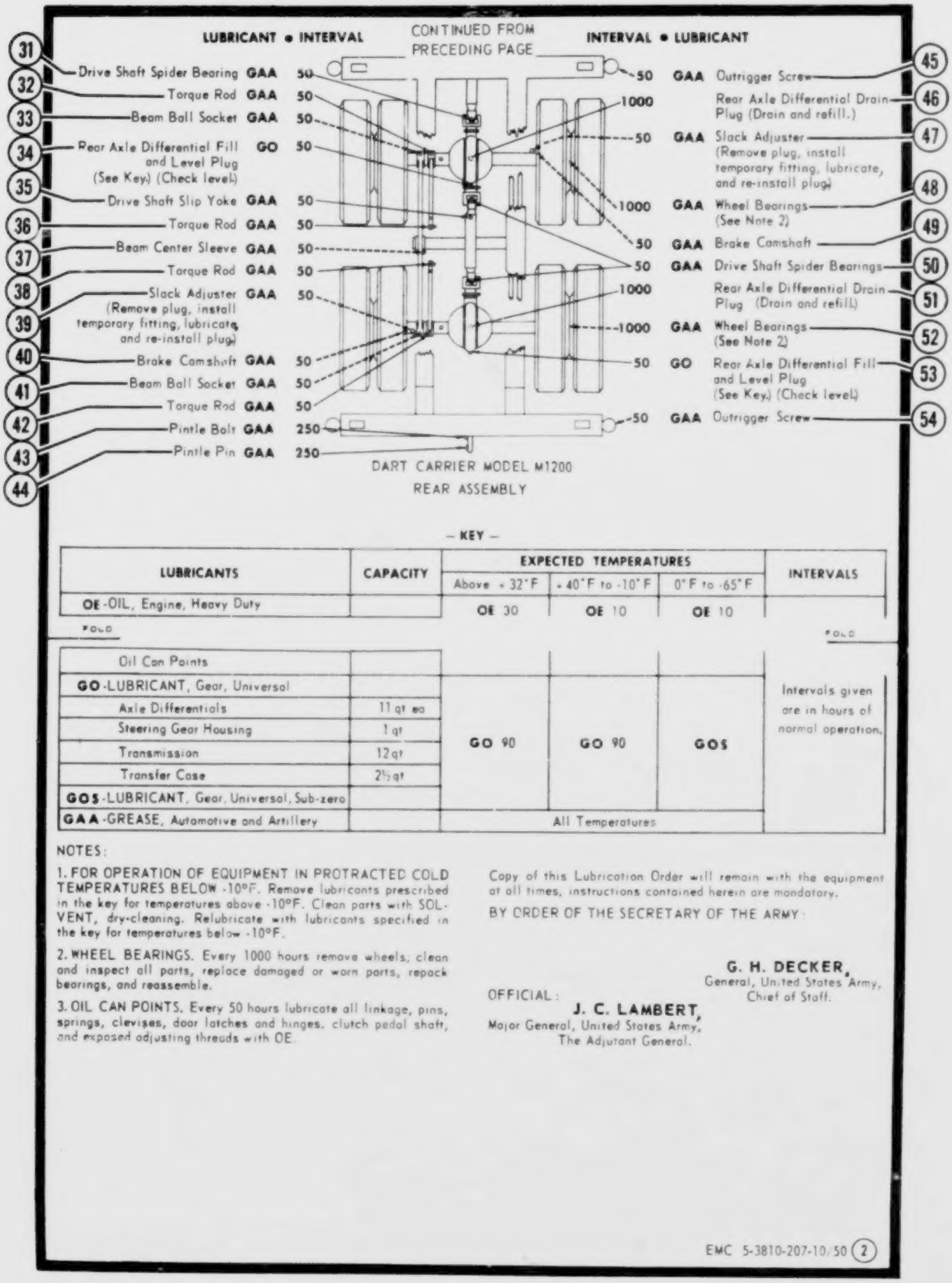
DART CARRIER MODEL M1200
FRONT ASSEMBLY

CONTINUED ON
FOLLOWING PAGE

INTERVAL	LUBRICANT		
50	GAA	Steering Cylinder Balls	16
50	GAA	Front Spring Shackle Bolt	17
1000		Front Axle Differential Drain Plug (Drain and refill.)	18
50	GAA	Slack Adjuster (Remove plug, install temporary fitting, lubricate, and re-install plug.)	19
50	GAA	Brake Shoe Camshaft	20
1000	GAA	Front Wheel Bearings (See Note 2.)	21
10	GAA	Steering Knuckle Bearings	22
50	GAA	Drive Shaft Spider Bearing (1 fitting each end of shaft.)	23
50	GAA	Clutch Throwout Bearing	24
1000		Transmission Drain Plug (Drain and refill.)	25
50	GAA	Drive Shaft Slip Yoke (Upper)	26
50	GAA	Drive Shaft Slip Yoke (Lower)	27
1000		Transfer Case Drain Plug (Drain and refill.)	28
50	GAA	Emergency Brake Cable (Remove plug and install temporary fitting, lubricate, and re-install plug.)	29
50	GAA	Drive Shaft Spider Bearing	30

EMC 5-3810-207-10/50 ①

Front
Figure 50. Lubrication order.



	LUBRICANT	INTERVAL
(31) Drive Shaft Spider Bearing	GAA	50
(32) Torque Rod	GAA	50
(33) Beam Ball Socket	GAA	50
(34) Rear Axle Differential Fill and Level Plug (See Key.) (Check level.)	GO	50
(35) Drive Shaft Slip Yoke	GAA	50
(36) Torque Rod	GAA	50
(37) Beam Center Sleeve	GAA	50
(38) Torque Rod	GAA	50
(39) Slack Adjuster (Remove plug, install temporary fitting, lubricate, and re-install plug.)	GAA	50
(40) Brake Camshaft	GAA	50
(41) Beam Ball Socket	GAA	50
(42) Torque Rod	GAA	50
(43) Pintle Bolt	GAA	250
(44) Pintle Pin	GAA	250

CONTINUED FROM PRECEDING PAGE

INTERVAL	LUBRICANT	
50	GAA	Outrigger Screw (45)
1000		Rear Axle Differential Drain Plug (Drain and refill.) (46)
50	GAA	Slack Adjuster (Remove plug, install temporary fitting, lubricate, and re-install plug.) (47)
1000	GAA	Wheel Bearings (See Note 2) (48)
50	GAA	Brake Camshaft (49)
50	GAA	Drive Shaft Spider Bearings (50)
1000		Rear Axle Differential Drain Plug (Drain and refill.) (51)
1000	GAA	Wheel Bearings (See Note 2) (52)
50	GO	Rear Axle Differential Fill and Level Plug (See Key.) (Check level.) (53)
50	GAA	Outrigger Screw (54)

DART CARRIER MODEL M1200
REAR ASSEMBLY

– KEY –

LUBRICANTS	CAPACITY	EXPECTED TEMPERATURES			INTERVALS
		Above + 32°F	+ 40°F to -10°F	0°F to -65°F	
OE-OIL, Engine, Heavy Duty		**OE** 30	**OE** 10	**OE** 10	
Oil Can Points					
GO-LUBRICANT, Gear, Universal		GO 90	GO 90	GOS	Intervals given are in hours of normal operation.
Axle Differentials	11 qt ea				
Steering Gear Housing	1 qt				
Transmission	12 qt				
Transfer Case	2½ qt				
GOS-LUBRICANT, Gear, Universal, Sub-zero					
GAA-GREASE, Automotive and Artillery		All Temperatures			

NOTES:

1. FOR OPERATION OF EQUIPMENT IN PROTRACTED COLD TEMPERATURES BELOW -10°F. Remove lubricants prescribed in the key for temperatures above -10°F. Clean parts with SOLVENT, dry-cleaning. Relubricate with lubricants specified in the key for temperatures below -10°F.

2. WHEEL BEARINGS. Every 1000 hours remove wheels; clean and inspect all parts, replace damaged or worn parts, repack bearings, and reassemble.

3. OIL CAN POINTS. Every 50 hours lubricate all linkage, pins, springs, clevises, door latches and hinges, clutch pedal shaft, and exposed adjusting threads with OE.

Copy of this Lubrication Order will remain with the equipment at all times, instructions contained herein are mandatory.

BY ORDER OF THE SECRETARY OF THE ARMY:

G. H. DECKER,
General, United States Army,
Chief of Staff.

OFFICIAL:
J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

EMC 5-3810-207-10/50 ②

Back
Figure 50 —Continued.

LUBRICATION ORDER

LO 5-3810-207-20-2

8 NOVEMBER 1961 (Supersedes LO 5-3810-207-20, 5 Aug 1959)

CRANE-SHOVEL BASIC UNIT, TRUCK MOUNTED: 20 TON, 3/4 CU YD; GASOLINE DRIVEN, 6X6; AND WINTERIZED TO -65°; (QUICKWAY MODEL M200) W/ ENGINE CONTINENTAL MODEL BS-415, AND CARRIER ENGINE CONTINENTAL MODEL SS-6749

Reference. TM 5-3810-207-10, -20 and -35 LO 5-3810-207-20-1, -3, -4 and -5 SM 10-1-C4-1

Intervals are based on normal hours of operations. Reduce to compensate for abnormal operations and severe conditions. During inactive periods sufficient lubrication must be performed for adequate preservation.

Clean fittings before lubricating.

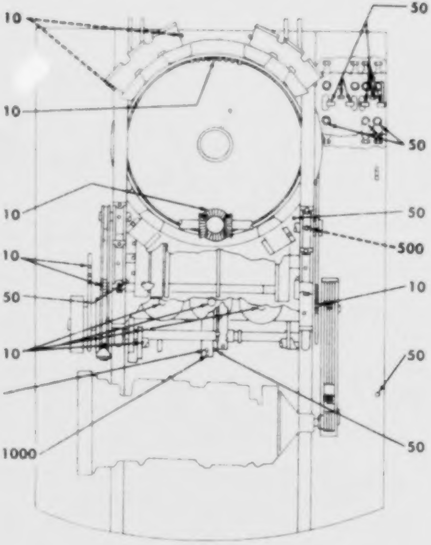
Relubricate after washing or fording.

A dotted circle indicates a drain below.

Clean parts with SOLVENT, dry-cleaning, or with OIL, fuel, Diesel. Dry before lubricating.

Lubricate points indicated by dotted arrow shafts on both sides of equipment.

Drain gearcases when hot. Fill and check level.



		LUBRICANT	INTERVAL
(55)	Double Conical Rollers (Beneath deck)	GAA	10
(56)	Base Ring Gear and Vertical Swing Spur Gear (Clean and coat) (Remove cover to expose base ring gear.)	CW-11	10
(57)	Bevel Gear (Clean and coat)	CW-11	10
(58)	Drive Chains (Clean and coat)	OE	10
(59)	Main Hoist and Haulback Brake Control Bushing (Beneath deck)	GAA	50
(60)	Gantry Sheaves (4 fittings)	GAA	10
(61)	Boom Hoist Power Down Gearcase Fill Plug (See Key.)	GO	
(62)	Boom Hoist Power Down Gearcase Drain Plug (Drain and refill.)		1000

INTERVAL	LUBRICANT		
50	GAA	Control Levers, Brake Pedals, and Shafts (6 fittings)	(63)
50	HBA	Hydraulic Control Cylinders Fill and Level Plugs (See Key.) (Check level.)	(64)
50	GAA	Swing Lock Lever	(65)
500	GAA	Swing Shaft Bearing	(66)
10	OE	Drive Chain (Clean and coat.)	(67)
50	GAA	Jaw Clutch Control Lever Pivot (Beneath deck)	(68)
50		Boom Hoist Power Down Gearcase Level Plug (Check level.)	(69)

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MACHINE DECK

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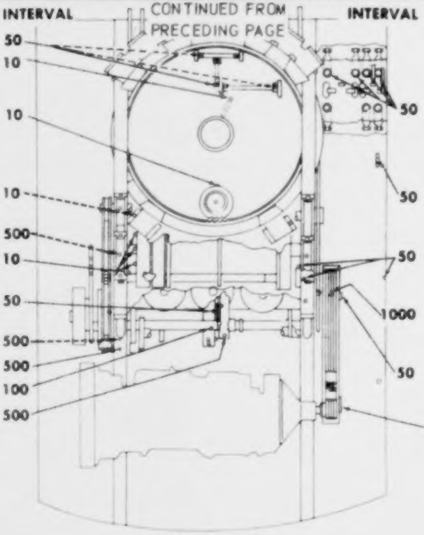
EMC 5-3810-207-10/50 (3)

Front

Figure 50—Continued.

	LUBRICANT • INTERVAL		
(70)	Swing Lock Assembly	GAA	50
(71)	Center Rotating Bushing	GAA	10
(72)	Vertical Swing Shaft Bearings	GAA	10
(73)	Single Conical Rollers (Beneath deck)	GAA	10
(74)	Main Hoist Shaft Bearing	GAA	500
(75)	Main Hoist Power Down (3 fittings)	GAA	10
(76)	Drive Chain (Clean and coat)	OE	50
(77)	Jack Shaft Bearing	GAA	500
(78)	Boom Hoist Shaft Bearing	GAA	500
(79)	Jack Shaft Jaw Clutch	GAA	100
(80)	Boom Hoist Shaft Bearing	GAA	500



INTERVAL • LUBRICANT			
50	HBA	Hydraulic Control Cylinders Fill and Level Plugs (See Key) (Check level.)	(81)
50	GAA	Engine Clutch Control Lever	(82)
50	GAA	Main Hoist and Haulback Brake Control Bushings (3 fittings)	(83)
1000		Power Transfer Chain Case Drain Plug (Drain and refill.)	(84)
50		Power Transfer Chain Case Sight Glass Level Gage (Check level.)	(85)
GO		Power Transfer Chain Case Fill Plate (See Key.)	(86)

— KEY —

LUBRICANTS	CAPACITY	EXPECTED TEMPERATURES			INTERVALS
		Above +32°F	+40°F to -10°F	0°F to -65°F	
OE-OIL, Engine, Heavy Duty		OE 30	OE 10	OE 10	
Oil Can Points					Intervals given are in hours of normal operation.
GO-LUBRICANT, Gear, Universal		GO 90	GO 90	GOS	
Boom Hoist Power Down Gearcase	1 qt				
Power Transfer Chain Case	2½ qt				
GOS-LUBRICANT, Gear, Universal, Sub-zero					
HBA-HYDRAULIC, Fluid, non-petroleum (Arctic Type)		All Temperatures			
Hydraulic, Control Cylinders	7 qt				
CW-11-LUBRICANT, Exposed Gear		CW-11 B	CW-11 B	CW-11 B	
GAA-GREASE, Automotive and Artillery		All Temperatures			

NOTES:

1. FOR OPERATION OF EQUIPMENT IN PROTRACTED COLD TEMPERATURES BELOW -10°F. Remove lubricants prescribed in the key for temperatures above -10°F. Clean parts with SOLVENT, dry-cleaning. Relubricate with lubricants specified in the key for temperatures below -10°F.

2. OIL CAN POINTS. Every 50 hours lubricate all linkage, pins, springs, clevises, door latches and hinges, and exposed adjusting threads with OE.

Copy of this Lubrication Order will remain with the equipment at all times; instructions contained herein are mandatory.

BY ORDER OF THE SECRETARY OF THE ARMY:

G. H. DECKER,
General, United States Army,
Chief of Staff.

OFFICIAL:
J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

EMC 5-3810-207-10/50 (4)

Back
Figure 50—Continued.

LUBRICATION ORDER LO 5-3810-207-20-3

8 NOVEMBER 1961

(Supersedes LO 5-3810-207-20, 6 Aug 1959)

CRANE-SHOVEL BASIC UNIT, TRUCK MOUNTED: 20 TON, 3/4 CU YD; GASOLINE DRIVEN, 6X6; AND WINTERIZED TO -65°; (QUICKWAY MODEL M200) W/ENGINE CONTINENTAL MODEL BS-415, AND CARRIER ENGINE CONTINENTAL MODEL SS-6749

Reference: TM 5-3810-207-10, -20 and -35 LO 5-3810-207-20-1, -2, -4 and -5 SM 10-1-C4-1

Intervals are based on normal hours of operations. Reduce to compensate for abnormal operations and severe conditions. During inactive periods sufficient lubrication must be performed for adequate preservation.

Clean fittings before lubricating.

Relubricate after washing or fording.

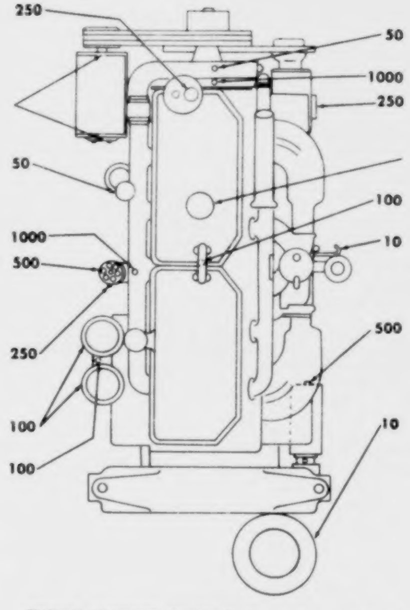
A dotted circle indicates a drain below.

Clean parts with SOLVENT, dry-cleaning, or with OIL, fuel, Diesel. Dry before lubricating.

Lubricate points indicated by dotted arrow shafts on both sides of equipment.

Drain crankcase when hot. Fill and check level.

		LUBRICANT	INTERVAL
(87)	Hydraulic Booster Reservoir Fill and Level Cap (See Key) (Check level)	OHA	250
	Generator (Sealed bearings, no lubrication required)		
(88)	Crankcase Breather (Every 50 hours remove breather, clean, re-oil and re-install.)	OE	50
(89)	Governor Drive Cable	GAA	1000
(90)	Distributor (Apply lubricant to camwick sparingly.)	OE	500
(91)	Distributor Reservoir Fill and Level Plug (Check and fill to plug opening)	OE	250
(92)	Oil Filters (See Note 2)		100
(93)	Oil Filters Base Drain Plug (Drain sediment)		100



INTERVAL	LUBRICANT		
50	GAA	Water Pump Bearing (Sparingly)	(94)
1000	GAA	Trunnion Bracket	(95)
250	OE	Compressor Intake Element (Disassemble, clean, re-oil and reassemble)	(96)
	OE	Crankcase Oil Fill Cap (See Key)	(97)
100		Crankcase Oil Drain Plug (Drain and refill)	(98)
10		Crankcase Oil Level Gage (Check level)	(99)
500	OE	Starting Motor Outboard and Drive End Bearings (See Note 4)	(100)
10	OE	Air Cleaner (Refill oil reservoir to level mark; every 50 hours disassemble entire unit, clean, re-oil, and reassemble.) (See Key.)	(101)

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ENGINE, CARRIER, CONTINENTAL MODEL SS-6749

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EMC 5-3810-207-10/50 (5)

Front

Figure 50 —Continued.

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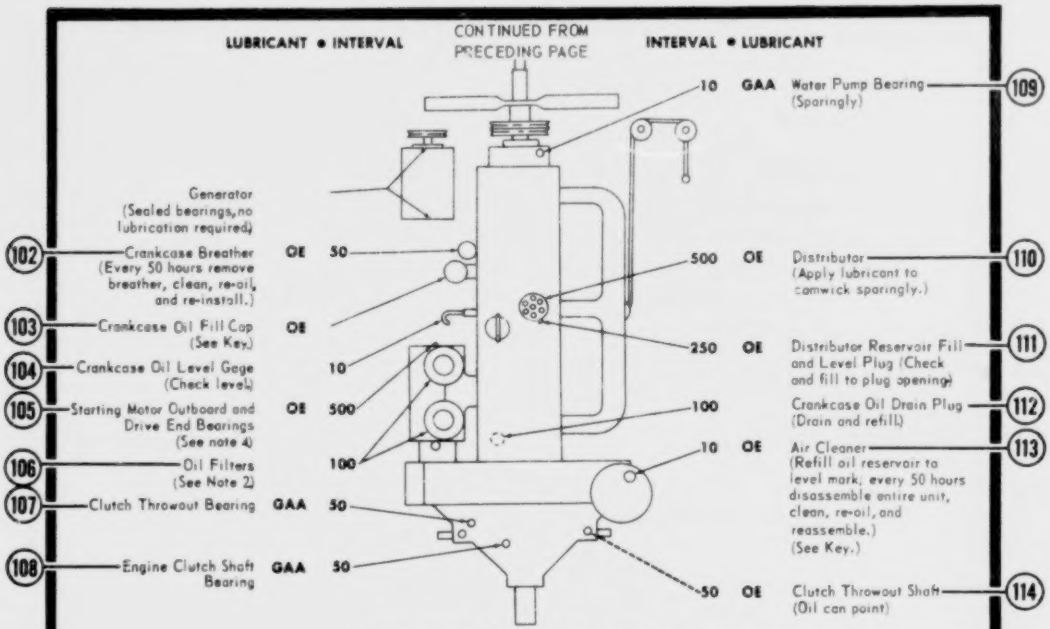

LUBRICANT • INTERVAL
INTERVAL • LUBRICANT
10 GAA Water Pump Bearing (Sparingly) (109)
Generator (Sealed bearings, no lubrication required)
(102) Crankcase Breather (Every 50 hours remove breather, clean, re-oil, and re-install.) OE 50
(103) Crankcase Oil Fill Cap (See Key.) OE
(104) Crankcase Oil Level Gage (Check level.) 10
(105) Starting Motor Outboard and Drive End Bearings (See note 4) OE 500
(106) Oil Filters (See Note 2) 100
(107) Clutch Throwout Bearing GAA 50
(108) Engine Clutch Shaft Bearing GAA 50
500 OE Distributor (Apply lubricant to camwick sparingly.) (110)
250 OE Distributor Reservoir Fill and Level Plug (Check and fill to plug opening) (111)
100 Crankcase Oil Drain Plug (Drain and refill.) (112)
10 OE Air Cleaner (Refill oil reservoir to level mark; every 50 hours disassemble entire unit, clean, re-oil, and reassemble.) (See Key.) (113)
50 OE Clutch Throwout Shaft (Oil can point) (114)

ENGINE, CRANE, CONTINENTAL MODEL BS-415

— KEY —

LUBRICANTS	CAPACITY	EXPECTED TEMPERATURES			INTERVALS
		Above + 32°F	+40°F to -10°F	0°F to -65°F	
OE-OIL, Engine, Heavy Duty		OE 30 or 9250	OE 10 or 9110	OES	Intervals given are in hours of normal operation.
Carrier Engine Crankcase	18 qt				
Carrier Engine Air Cleaner	2¼ qt				
Crane Engine Crankcase	8 qt				
Crane Engine Air Cleaner	1 qt				
Oil Can Points					
OES-OIL, Engine, Sub-zero					
OHA-HYDRAULIC, Fluid Petroleum Base		All Temperatures			
Hydraulic Booster Reservoir	4 qt				
GAA-GREASE, Automotive and Artillery					

NOTES:

1. FOR OPERATION OF EQUIPMENT IN PROTRACTED COLD TEMPERATURES BELOW -10°F. Remove lubricants prescribed in the key for temperatures above -10°F. Clean parts with SOLVENT, dry-cleaning. Relubricate with lubricants specified in the key for temperatures below -10°F.

2. OIL FILTERS. Every 100 hours remove filter elements, clean housings, install new elements, fill crankcase, operate engine for five minutes, check for leaks, check crankcase oil level, and bring to full mark.

3. OIL CAN POINTS. Every 50 hours lubricate all linkage, throttle control and sheaves, pins, springs, and exposed adjusting threads with OE.

4. STARTING MOTOR DRIVE END BEARING AND CENTER BEARING. Second Echelon every 500 hours remove starting motor and lubricate drive end bearing wick with OE, center bearing , serviced by Third Echelon at time of disassembly.

Copy of this Lubrication Order will remain with the equipment at all times; instructions contained herein are mandatory.

BY ORDER OF THE SECRETARY OF THE ARMY:

G. H. DECKER,
General, United States Army,
Chief of Staff.

OFFICIAL:
J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

EMC 5-3810-207-10/50 (6)

Back
Figure 50—Continued.

LUBRICATION ORDER

LO 5-3810-207-20-4

8 NOVEMBER 1961 (Supersedes LO 5-3810-207-20, 6 Aug 1959)

CRANE-SHOVEL BASIC UNIT, TRUCK MOUNTED: 20 TON, 3/4 CU YD; GASOLINE DRIVEN, 6X6; AND WINTERIZED TO -65°; (QUICKWAY MODEL M200) W/ENGINE CONTINENTAL MODEL BS-415, AND CARRIER ENGINE CONTINENTAL MODEL SS-6749

Reference: TM 5-3810-207-10, -20 and -35 LO 5-3810-207-20-1, -2, -3 and -5 SM 10-1-C4-1

Intervals are based on normal hours of operations. Reduce to compensate for abnormal operations and severe conditions. During inactive periods sufficient lubrication must be performed for adequate preservation.

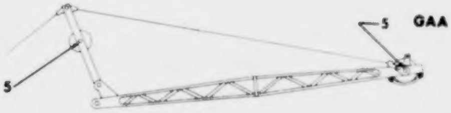
Clean fittings before lubricating.

Relubricate after washing or fording.

Clean parts with SOLVENT, dry-cleaning, or with OIL, fuel, Diesel. Dry before lubricating.

Lubricate points indicated by dotted arrow shafts on both sides of equipment.

LUBRICANT • INTERVAL **INTERVAL • LUBRICANT**



JIB BOOM

(115)	Jib Strut Sheave Bushing	**GAA**	5

5	**GAA**	Jib Boom Cable Sheave Bushing	(128)

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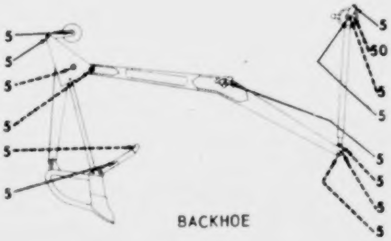
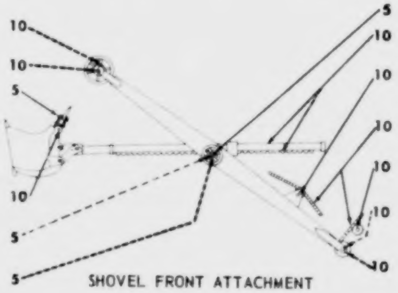


BACKHOE

(116)	Bridle Block Sheave Bushing	**GAA**	5
(117)	Bridle Bar Stick Pin	**GAA**	5
(118)	Boom to Bucket Hinge Pins	**GAA**	5
(119)	Cable Drag Rollers	**GAA**	5
(120)	Bail Block Cable Rollers	**GAA**	5
(121)	Bail Block Sheave Bushing	**GAA**	5

5	**GAA**	Gantry Cable Roller	(129)
50	**GAA**	Gantry Hoist Cable Sheave Bushing	(130)
5	**GAA**	Cable Anchor Bushings	(131)
5	**GAA**	Boom Hoist Cable Sheave Bushing	(132)
5	**GAA**	Boom Sheave Bushing	(133)
5	**GAA**	Gantry Foot	(134)
5	**GAA**	Pull Cable Roller Bushings	(135)
5	**GAA**	Boom Foot Pin Bushings	(136)



SHOVEL FRONT ATTACHMENT

(122)	Boom Point Hoist Sheave Bushing	**GAA**	10
(123)	Boom Hoist Sheave Bushing	**GAA**	10
(124)	Bail Block Sheave Bushing	**GAA**	5
(125)	Bail Block Hinge Pin Bushing	**GAA**	10
(126)	Saddle Block Bearings	**GAA**	5
(127)	Shipper Shaft Boom Bearings	**GAA**	5

5	**GAA**	Dipper Trip Arm	(137)
10	**CW-11**	Dipper Stick and Rack Teeth (Clean and coat)	(138)
10	**GAA**	Chain Tightener Sprocket Bushing	(139)
10	**OE**	Crowd Chains (Clean and coat)	(140)
10	**GAA**	Chain Tightener Sprocket Bushing	(141)
10	**GAA**	Intermediate Crowd and Rerack Shaft Bushings	(142)
10	**GAA**	Boom Foot Pin Bushings	(143)

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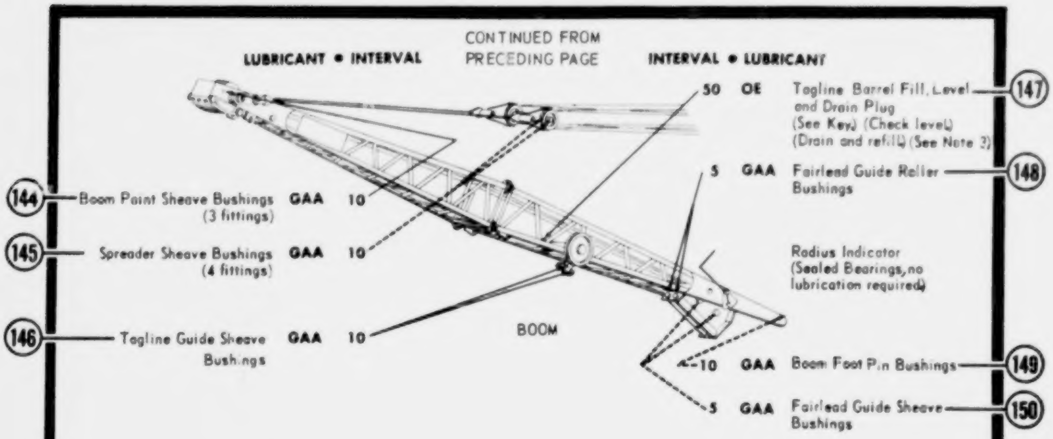
FOLLOWING PAGE

EMC 5-3810-207-10/50 ⑦

Front
Figure 50 —Continued.


CONTINUED FROM PRECEDING PAGE
LUBRICANT • INTERVAL
INTERVAL • LUBRICANT
(144) Boom Point Sheave Bushings (3 fittings) GAA 10
(145) Spreader Sheave Bushings (4 fittings) GAA 10
(146) Tagline Guide Sheave Bushings GAA 10
BOOM
50 OE Tagline Barrel Fill, Level and Drain Plug (See Key) (Check level) (Drain and refill) (See Note 3) (147)
5 GAA Fairlead Guide Roller Bushings (148)
Radius Indicator (Sealed Bearings, no lubrication required)
10 GAA Boom Foot Pin Bushings (149)
5 GAA Fairlead Guide Sheave Bushings (150)

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— KEY —

LUBRICANTS	CAPACITY	EXPECTED TEMPERATURES			INTERVALS
		Above +32°F	+40°F to -10°F	0°F to -65°F	
OE -OIL, Engine, Heavy Duty					Intervals given are in hours of normal operation.
Tagline Barrel	8 qt	OE 30 or 9250	OE 10 or 9110	OES	
Oil Can Points					
OES -OIL, Engine, Sub-zero					
CW-11-LUBRICANT, Exposed Gear,		CW-11 B	CW-11 B	CW-11 B	
GAA-GREASE, Automotive and Artillery		All Temperatures			

NOTES:

1. FOR OPERATION OF EQUIPMENT IN PROTRACTED COLD TEMPERATURES BELOW -10°F. Remove lubricants prescribed in the key for temperatures above -10°F. Clean parts with SOLVENT, dry-cleaning. Relubricate with lubricants specified in the key for temperatures below -10°F.
2. OIL CAN POINTS. Every 50 hours lubricate all pins, clevises, and exposed adjusting threads with OE, except those coming in contact with excavated material.
3. TAGLINE BARREL. Every 500 hours loosen mounting bolts, rotate to drain, return to up position and refill.
4. CABLES. Keep cables clean and lubricated with OE. Do not lubricate cables coming in contact with excavated material.

Copy of this Lubrication Order will remain with the equipment at all times; instructions contained herein are mandatory.

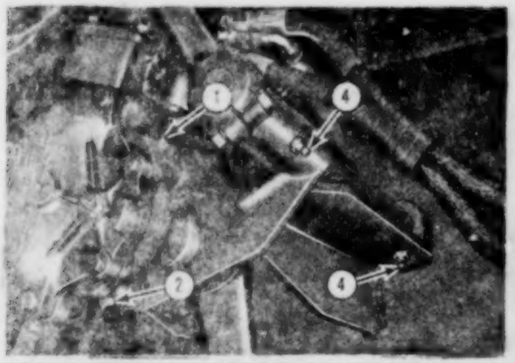
BY ORDER OF THE SECRETARY OF THE ARMY:

G. H. DECKER,
General, United States Army,
Chief of Staff.

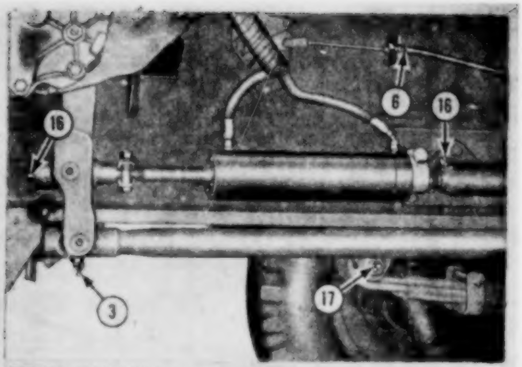
OFFICIAL:
J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

EMC 5-3810-207-10/50 (8)

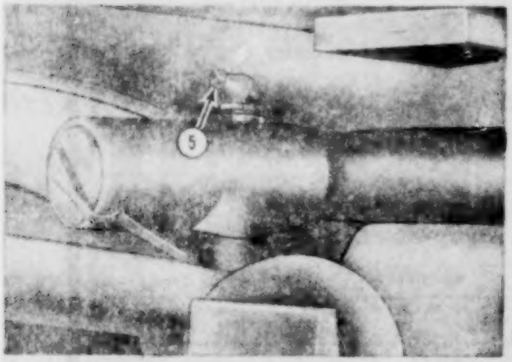
Back
Figure 50 —Continued.



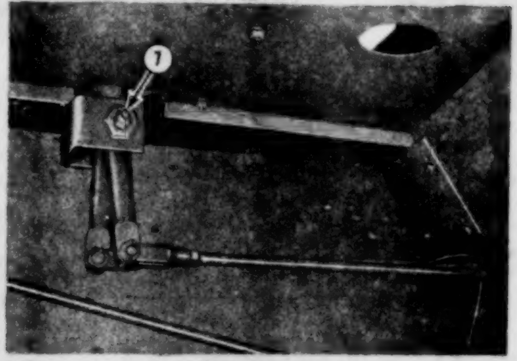
REF. 1 STEERING GEAR HOUSING FILL AND LEVEL PLUG
REF. 2 STEERING GEAR HOUSING DRAIN PLUG
REF. 4 CLUTCH CROSS SHAFT



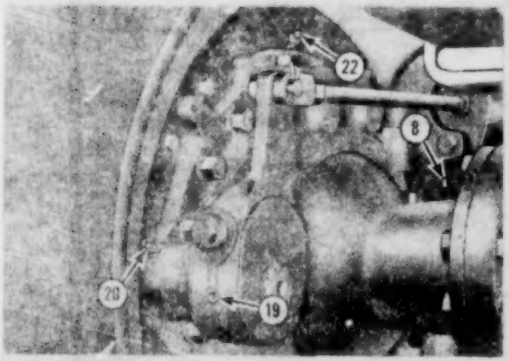
REF. 3 DRAG LINK
REF. 6 EMERGENCY BRAKE CABLE
REF. 16 STEERING CYLINDER BALLS
REF. 17 FRONT SPRING SHACKLE BOLT



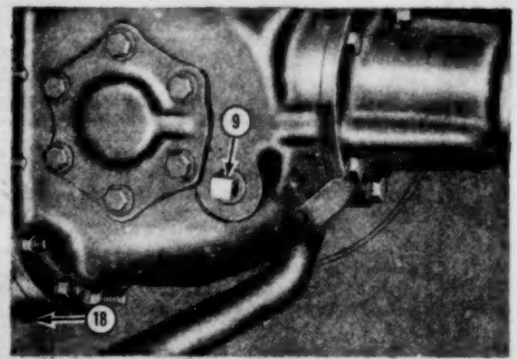
REF. 5 DRAG LINK



REF. 7 TRANSFER SHIFT LEVER



REF. 8 TIE ROD
REF. 19 SLACK ADJUSTER
REF. 20 BRAKE SHOE CAMSHAFT
REF. 22 STEERING KNUCKLE BEARINGS

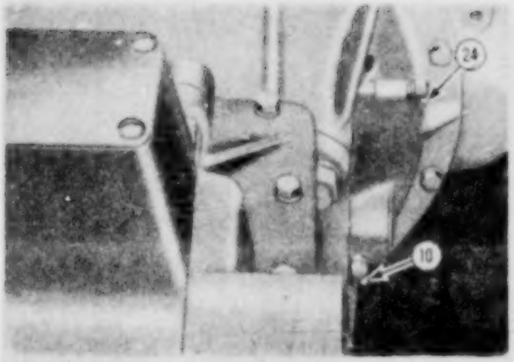


REF. 9 FRONT AXLE DIFFERENTIAL FILL AND LEVEL PLUG
REF. 18 FRONT AXLE DIFFERENTIAL DRAIN PLUG

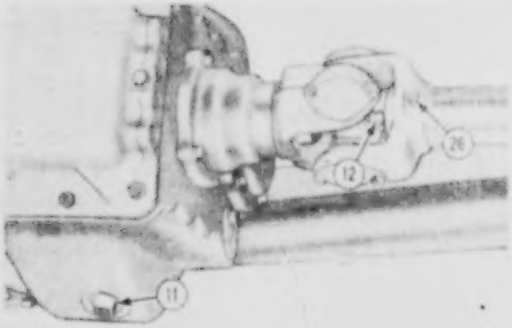
EMC 5-3810-207-10/50①

References 1 through 9, 16 through 20, and 22

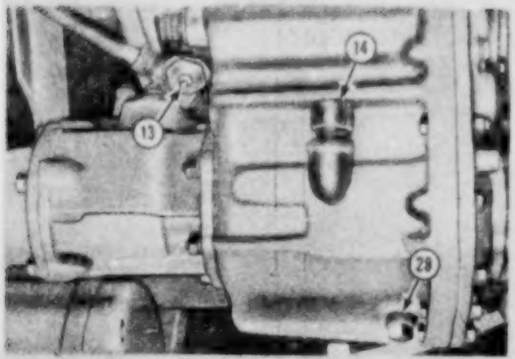
Figure 50—Continued.



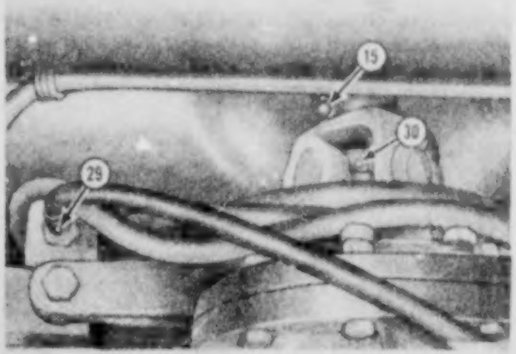
REF. 10 CLUTCH RELEASE SHAFT
REF. 24 CLUTCH THROWOUT BEARING



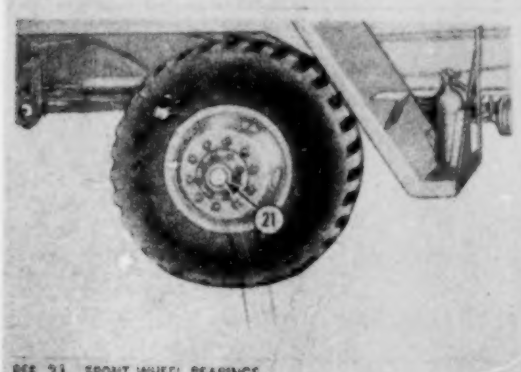
REF. 11 TRANSMISSION FILL AND LEVEL PLUG
REF. 12 DRIVE SHAFT SPIDER BEARINGS
REF. 26 DRIVE SHAFT SLIP YOKE (UPPER)



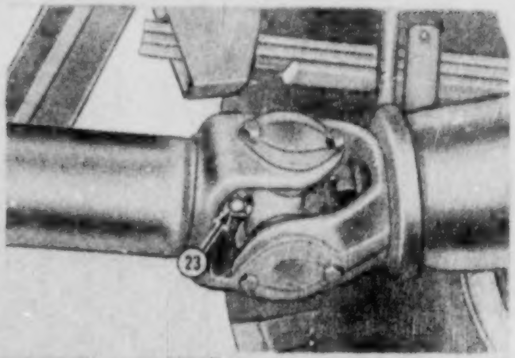
REF. 13 SPEEDOMETER DRIVE
REF. 14 TRANSFER CASE FILL AND LEVEL PLUG
REF. 28 TRANSFER CASE DRAIN PLUG



REF. 15 DRIVE SHAFT SLIP YOKE
REF. 29 EMERGENCY BRAKE CABLE
REF. 30 DRIVE SHAFT SPIDER BEARING



REF. 21 FRONT WHEEL BEARINGS

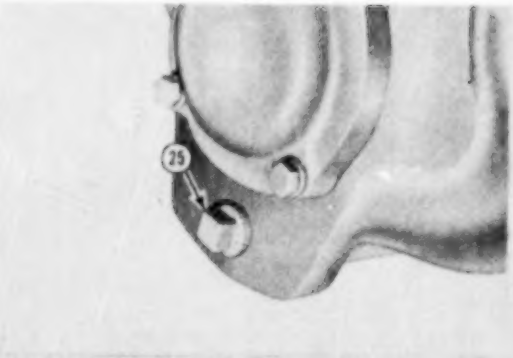


REF. 23 DRIVE SHAFT SPIDER BEARING

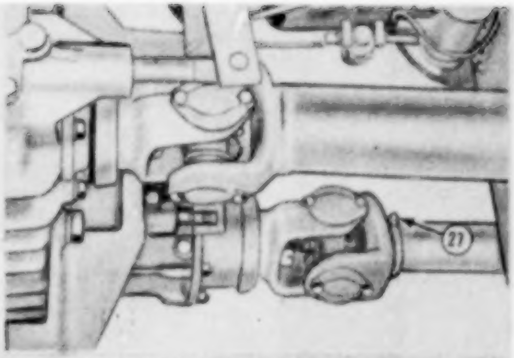
EMC 5-3810-207-10-50

References 10 through 15, 21, 23, 24, 26 and 28 through 30

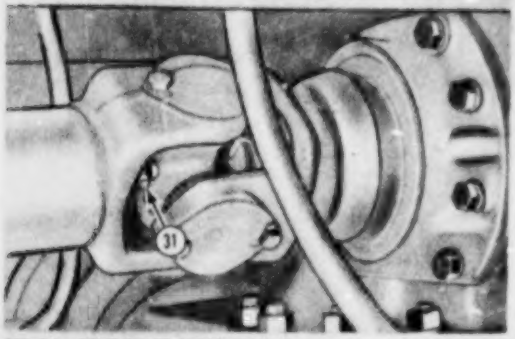
Figure 50—Continued.



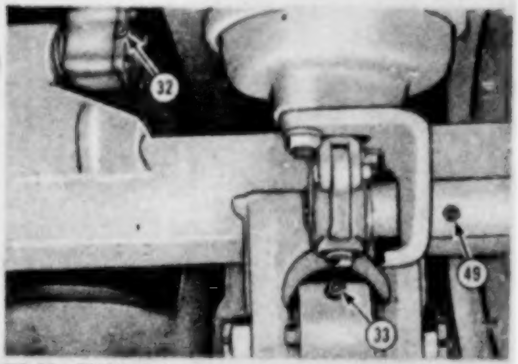
REF. 25 TRANSMISSION DRAIN PLUG



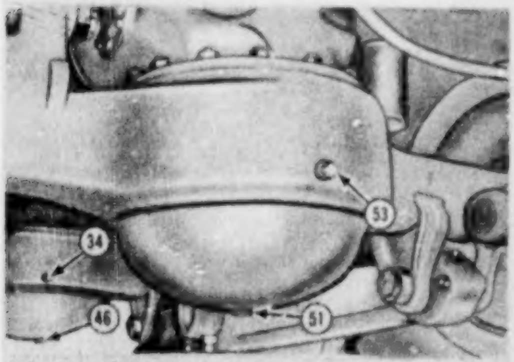
REF. 27 DRIVE SHAFT SLIP YOKE (LOWER)



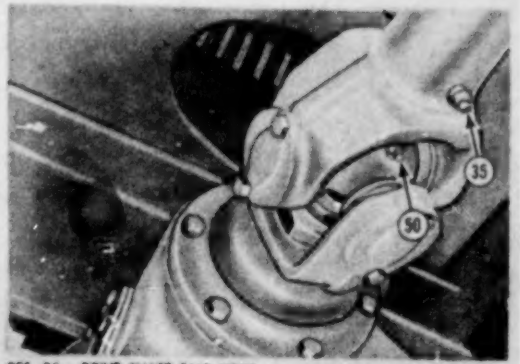
REF. 31 DRIVE SHAFT SPIDER BEARING



REF. 32 TORQUE ROD
REF. 33 BEAM BALL SOCKET
REF. 49 BRAKE CAMSHAFT



REF. 34 REAR AXLE DIFFERENTIAL FILL AND LEVEL PLUG
REF. 46 REAR AXLE DIFFERENTIAL DRAIN PLUG
REF. 51 REAR AXLE DIFFERENTIAL DRAIN PLUG
REF. 53 REAR AXLE DIFFERENTIAL FILL AND LEVEL PLUG

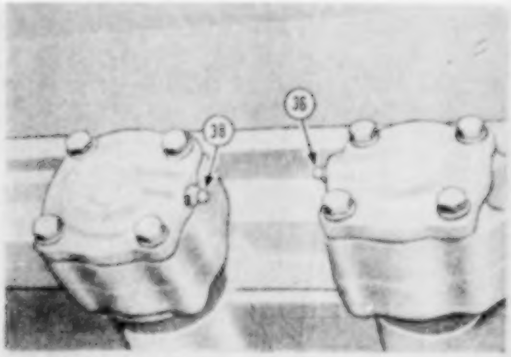


REF. 35 DRIVE SHAFT SLIP YOKE
REF. 50 DRIVE SHAFT SPIDER BEARINGS

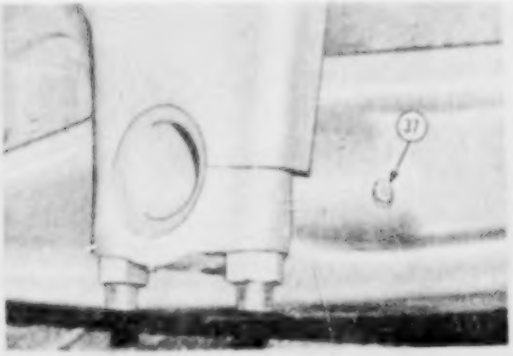
EMC 5-3810-207-10/50 (B)

References 25, 27, 31 through 35, 46, 49 through 51, and 53

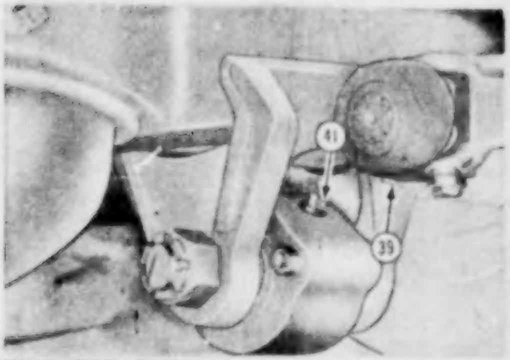
Figure 50—Continued.



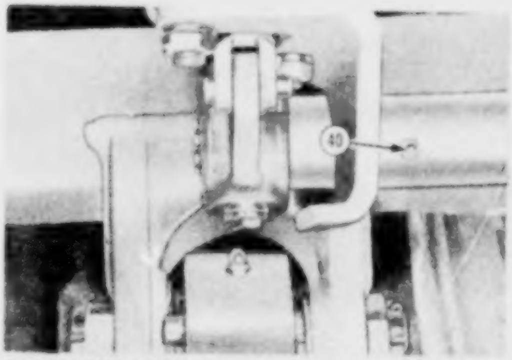
REF 36 TORQUE ROD
REF 38 TORQUE ROD



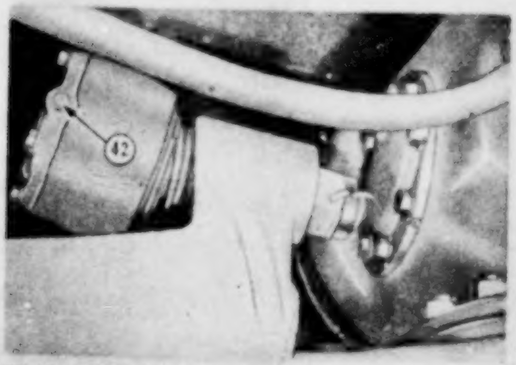
REF 37 BEAM CENTER SLEEVE



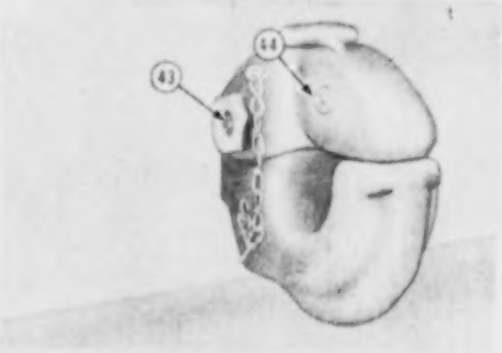
REF 39 SLACK ADJUSTER
REF 41 BEAM BALL SOCKET



REF 40 BRAKE CAMSHAFT



REF 42 TORQUE ROD

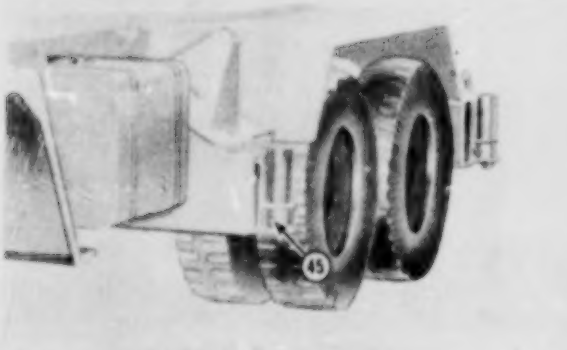


REF 43 PINTLE BOLT
REF 44 PINTLE PIN

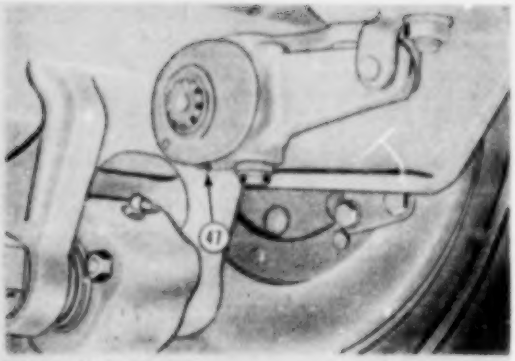
EMC 5-3810-207-10-30(12)

References 36 through 44

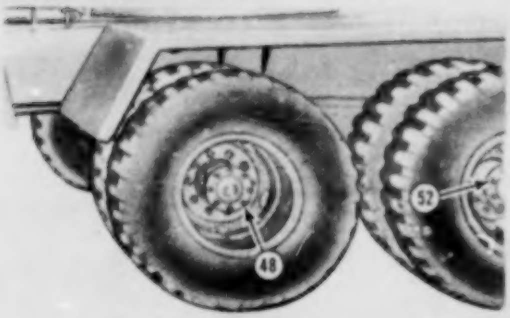
Figure 50—Continued.



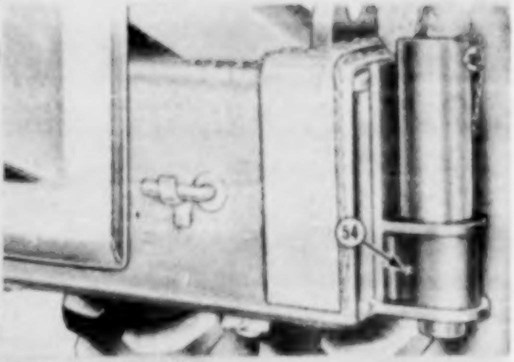
REF. 45 OUTRIGGER SCREW



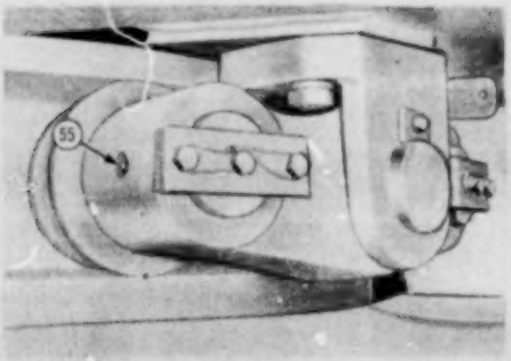
REF. 47 SLACK ADJUSTER



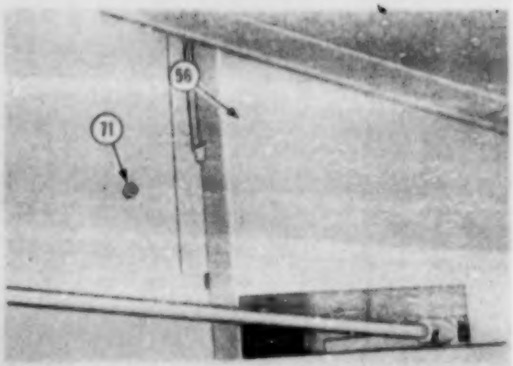
REF. 48 WHEEL BEARINGS
REF. 52 WHEEL BEARINGS



REF. 54 OUTRIGGER SCREW



REF. 55 DOUBLE CONICAL ROLLERS



REF. 56 BASE RING GEAR AND VERTICAL SWING SPUR GEAR
REF. 71 CENTER ROTATING BUSHING

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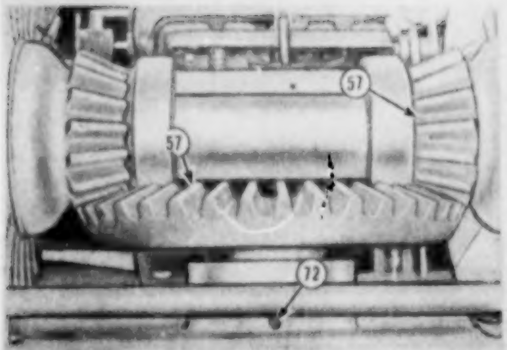
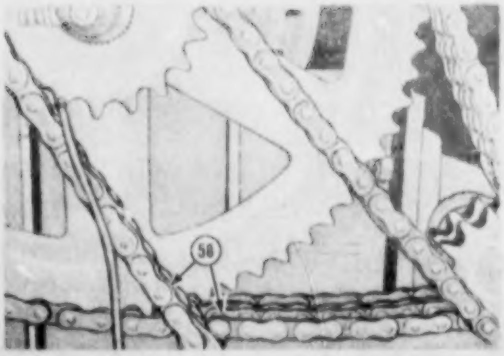
References 45, 47, 48, 52, 54 through 56 and 71
Figure 50—Continued.

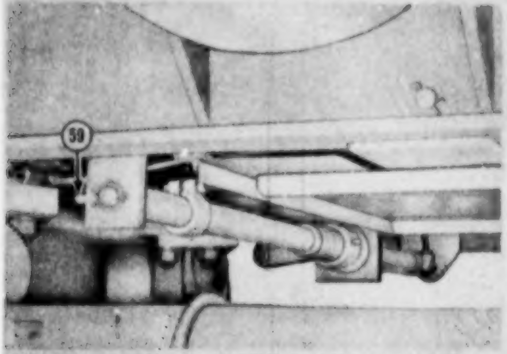


REF. 57 BEVEL GEAR

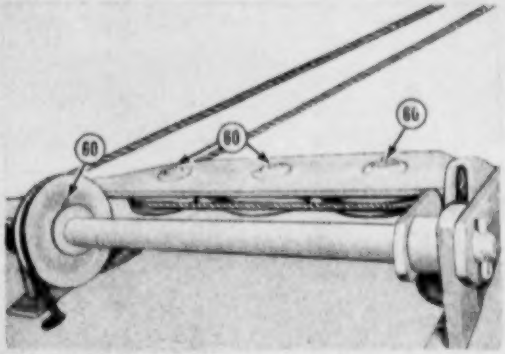
REF. 72 VERTICAL SWING SHAFT BEARINGS



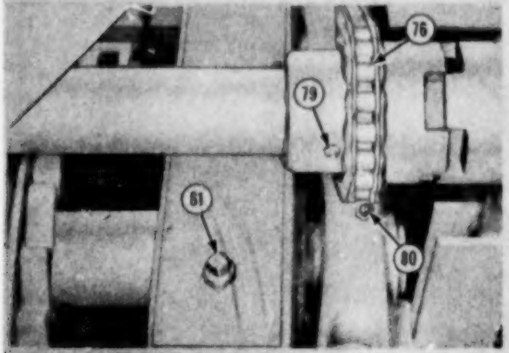
REF. 58 DRIVE CHAINS



REF. 59 MAIN HOIST AND HAULBACK BRAKE CONTROL BUSHING



REF. 60 GANTRY SHEAVES

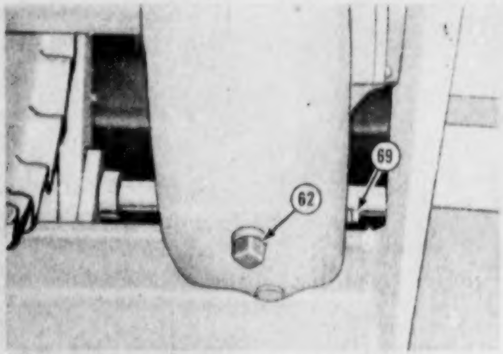


REF. 61 BOOM HOIST POWER DOWN GEARCASE FILL PLUG

REF. 76 DRIVE CHAIN

REF. 79 JACK SHAFT JAW CLUTCH

REF. 80 BOOM HOIST SHAFT BEARING

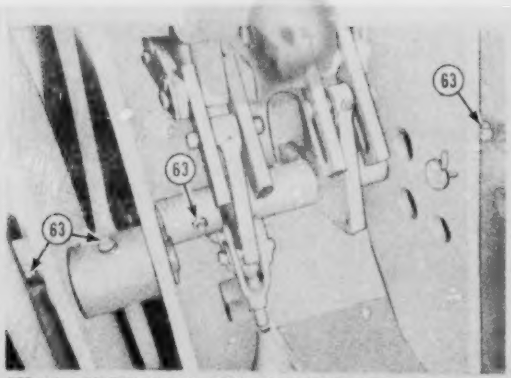


REF. 62 BOOM HOIST POWER DOWN GEARCASE DRAIN PLUG

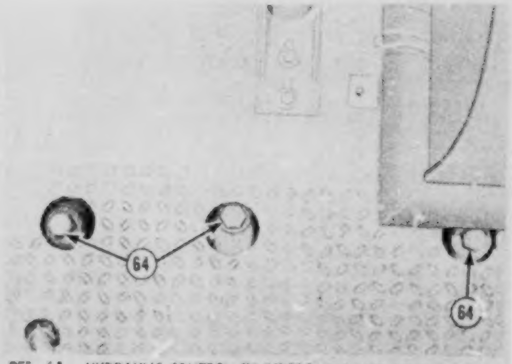
REF. 69 BOOM HOIST POWER DOWN GEARCASE LEVEL PLUG

EMC 5-3810-207-10/50 ⑭

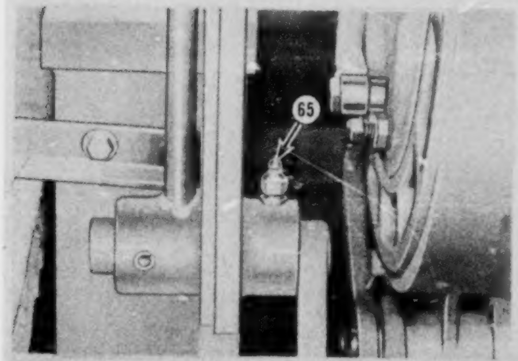
References 57 through 62, 69, 72, 76, 79, and 80
Figure 50—Continued.



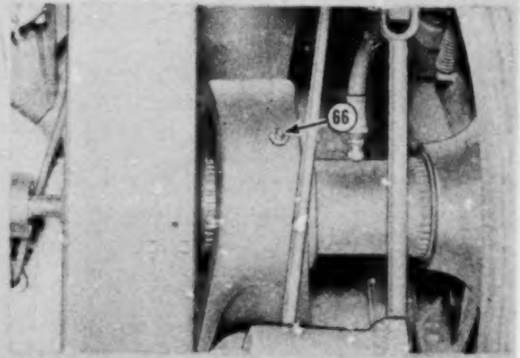
REF. 63 CONTROL LEVERS, BRAKE PEDALS, AND SHAFTS



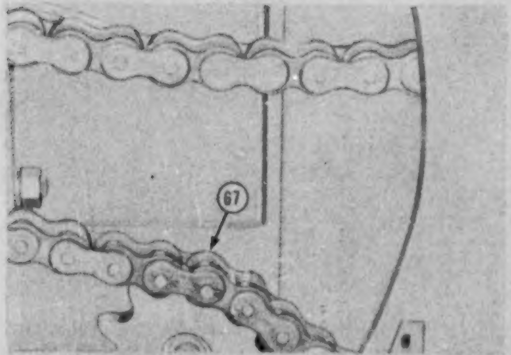
REF. 64 HYDRAULIC CONTROL CYLINDERS FILL AND LEVEL PLUGS



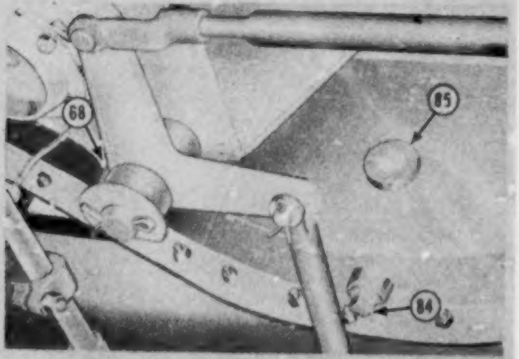
REF. 65 SWING LOCK LEVER



REF. 66 SWING SHAFT BEARING



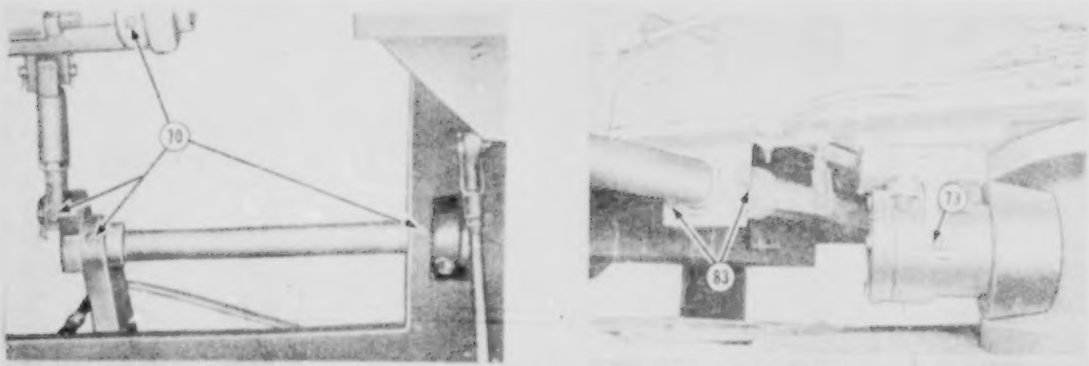
REF. 67 DRIVE CHAIN



REF. 68 JAW CLUTCH CONTROL LEVER PIVOT
REF. 84 POWER TRANSFER CHAIN CASE DRAIN PLUG
REF. 85 POWER TRANSFER CHAIN CASE SIGHT GLASS LEVEL GAGE

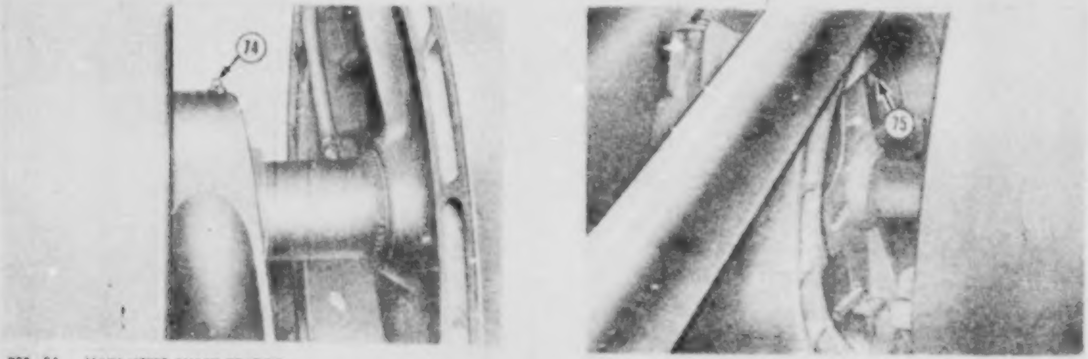
EMC 5-3810-207-10/50 (15)

References 63 through 68, 84, and 85
Figure 50—Continued.



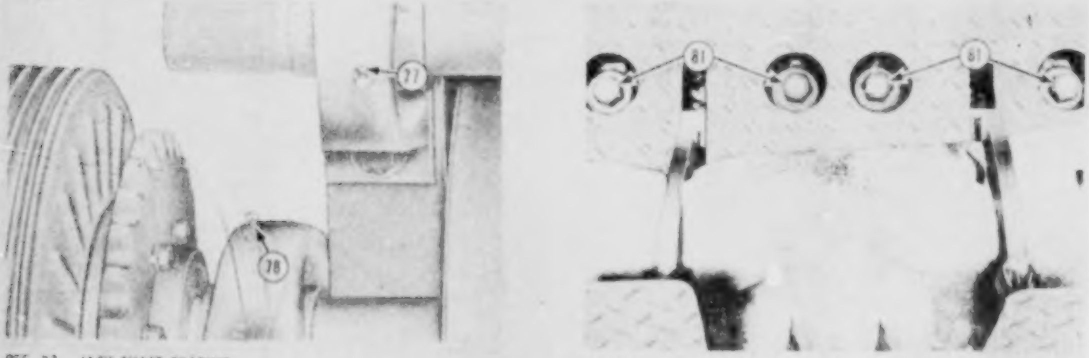
REF. 70 SWING LOCK ASSEMBLY

REF 73 SINGLE CONICAL ROLLERS
REF 83 MAIN HOIST AND HAULBACK BRAKE CONTROL BUSHINGS



REF. 74 MAIN HOIST SHAFT BEARING

REF 75 MAIN HOIST POWER DOWN



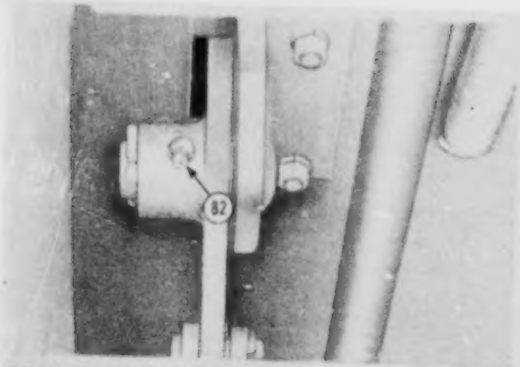
REF. 77 JACK SHAFT BEARING
REF. 78 BOOM HOIST SHAFT BEARING

REF 81 HYDRAULIC CONTROL CYLINDERS FILL AND LEVEL PLUGS

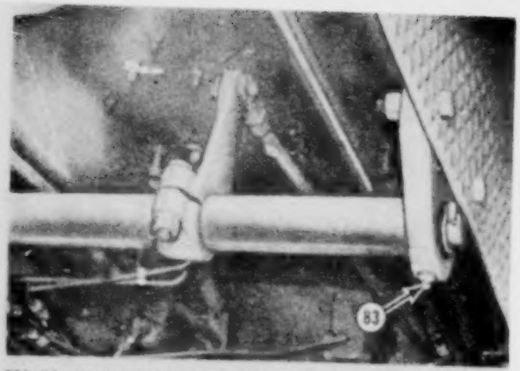
EMC 5-3810-207-10-50 (16)

References 70, 73 through 75, 77, 78, 81, and 83

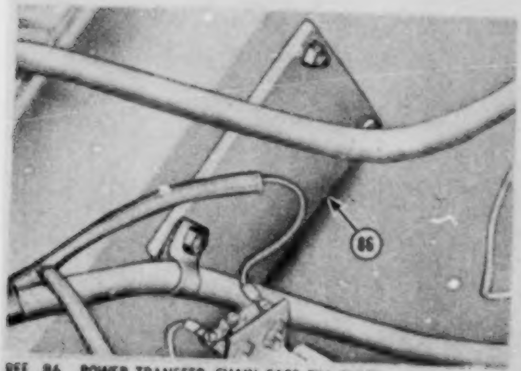
Figure 50—Continued.



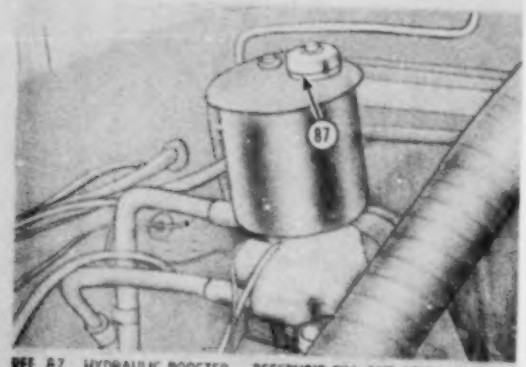
REF. 82 ENGINE CLUTCH CONTROL LEVER



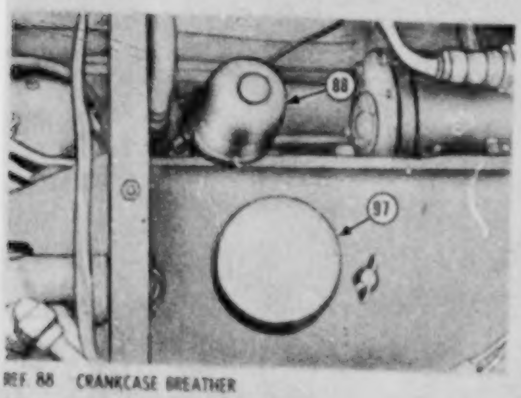
REF. 83 MAIN HOIST AND HAULBACK BRAKE CONTROL BUSHINGS



REF. 86 POWER TRANSFER CHAIN CASE FILL PLATE

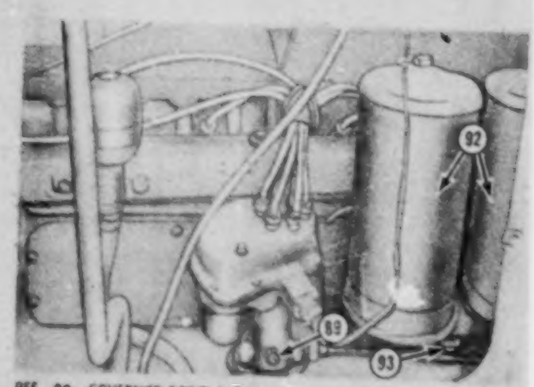


REF. 87 HYDRAULIC BOOSTER RESERVOIR FILL AND LEVEL CAP



REF. 88 CRANKCASE BREATHER

REF. 97 CRANKCASE OIL FILL CAP



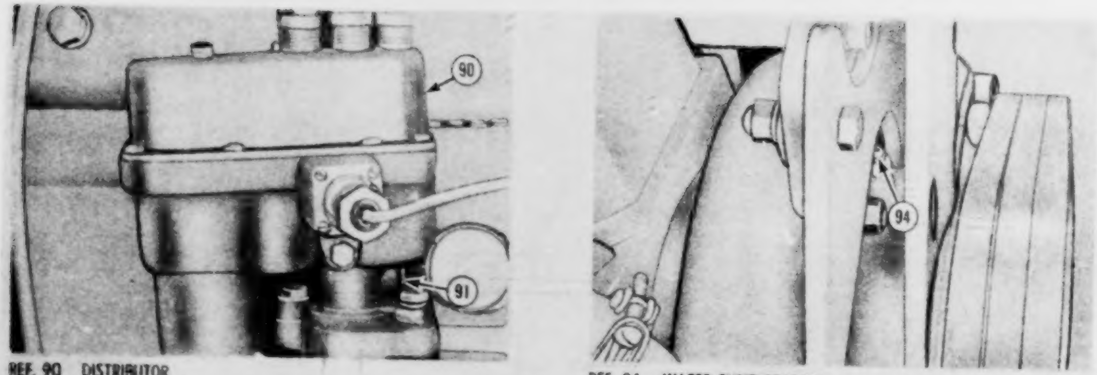
REF. 89 GOVERNOR DRIVE CABLE

REF. 92 OIL FILTERS

REF. 93 OIL FILTERS BASE DRAIN PLUG

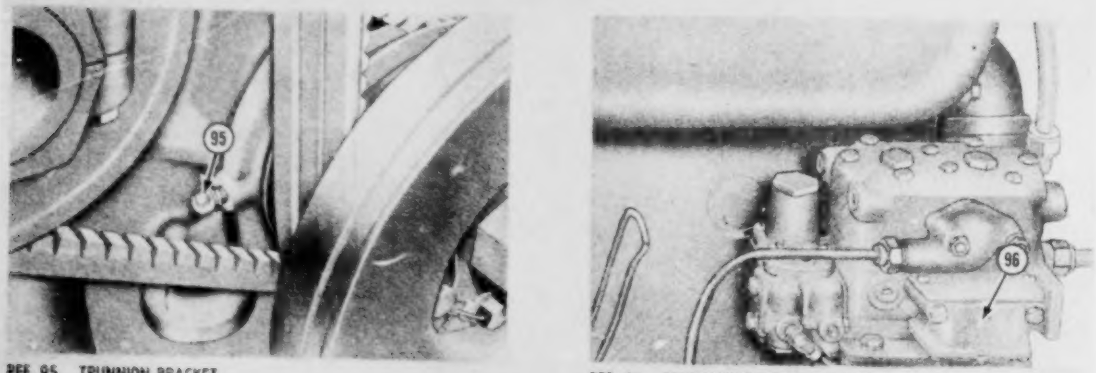
EMC 5-3810-207-10-30

References 82, 83, 86 through 89, 92, 93, and 97
Figure 50—Continued.



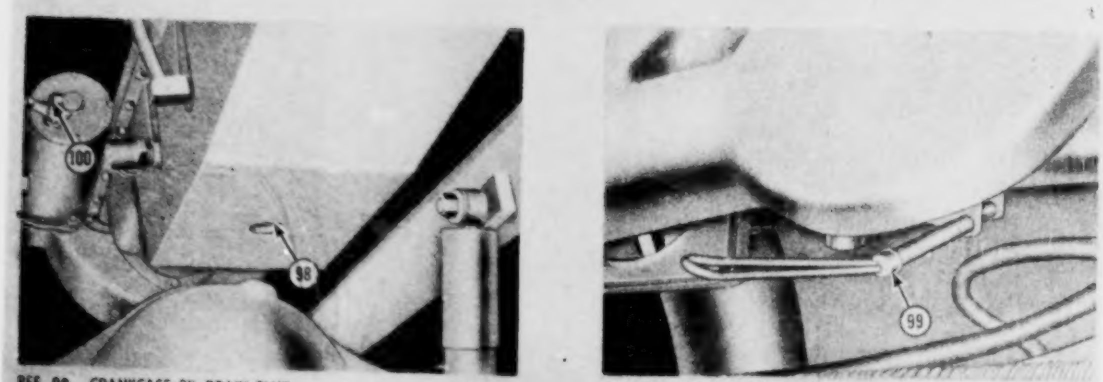
REF. 90 DISTRIBUTOR
REF. 91 DISTRIBUTOR RESERVOIR FILL AND LEVEL PLUG

REF. 94 WATER PUMP BEARING



REF. 95 TRUNNION BRACKET

REF. 96 COMPRESSOR INTAKE ELEMENT

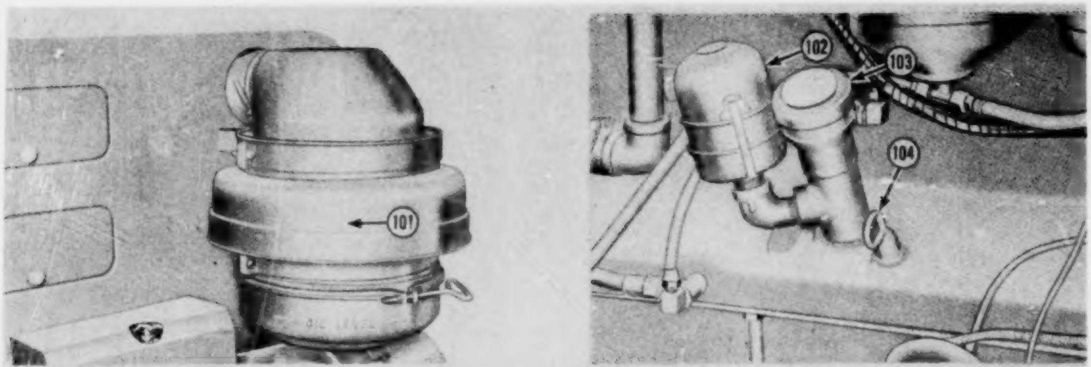


REF. 98 CRANKCASE OIL DRAIN PLUG
F. 100 STARTING MOTOR OUTBOARD AND DRIVE END BEARINGS

REF. 99 CRANKCASE OIL LEVEL GAGE

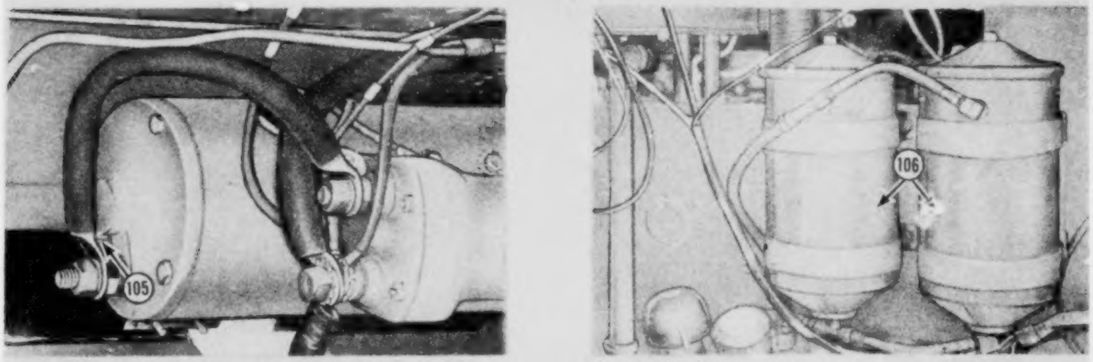
EMC 5-3810-207-10-50 (18)

References 90, 91, 94 through 96, and 98 through 100
Figure 50—Continued.



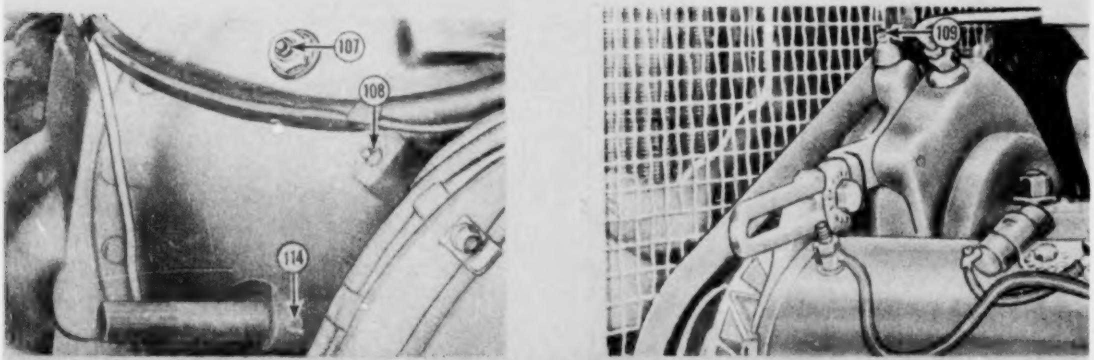
REF. 101 AIR CLEANER

REF. 102 CRANKCASE BREATHER
REF. 103 CRANKCASE OIL FILL CAP
REF. 104 CRANKCASE OIL LEVEL GAGE



REF. 105 STARTING MOTOR OUTBOARD AND DRIVE END BEARINGS

REF. 106 OIL FILTERS

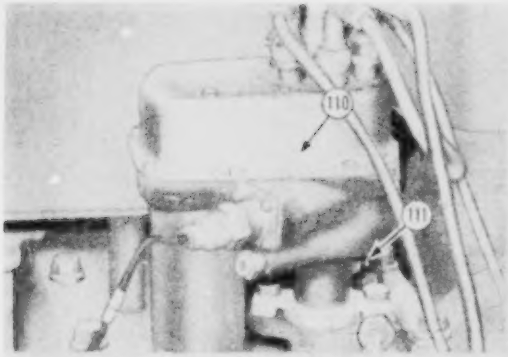


REF. 107 CLUTCH THROWOUT BEARING
REF. 108 ENGINE CLUTCH SHAFT BEARING
REF. 114 CLUTCH THROWOUT SHAFT

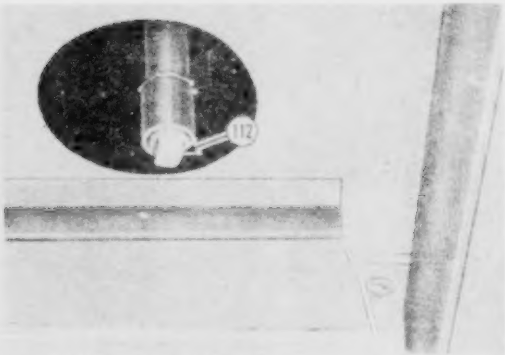
REF. 109 WATER PUMP BEARING

EMC 5-3810-207-10/50 (19)

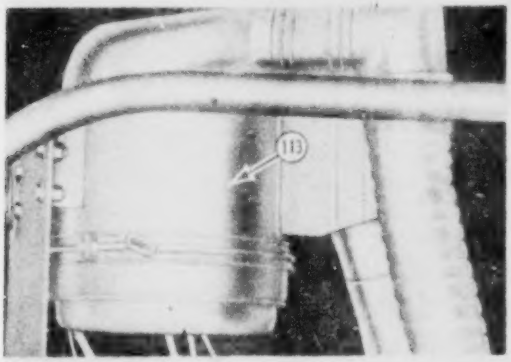
References 101 through 109 and 114
Figure 50—Continued.



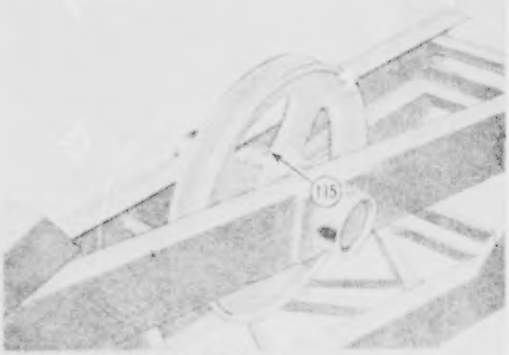
REF 110 DISTRIBUTOR
REF 111 DISTRIBUTOR RESERVOIR FILL AND LEVEL PLUG



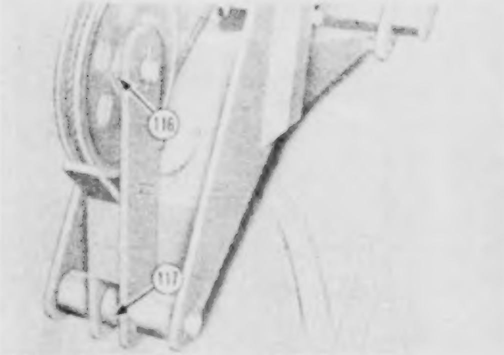
REF 112 CRANKCASE OIL DRAIN PLUG



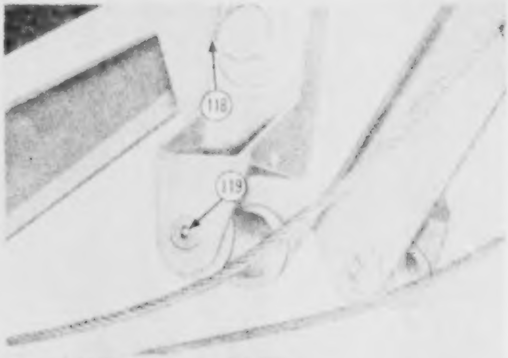
REF 113 AIR CLEANER



REF 115 JIB STRUT SHEAVE BUSHING



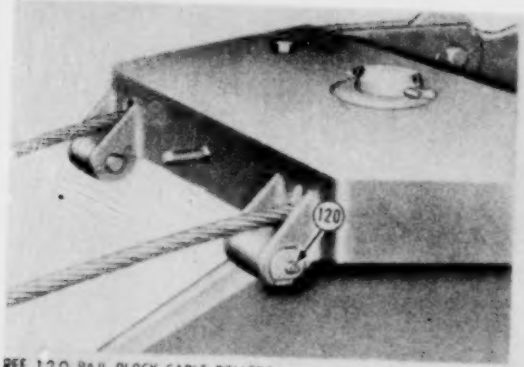
REF 116 BRIDLE BLOCK SHEAVE BUSHING
REF 117 BRIDLE BAR STICK PIN



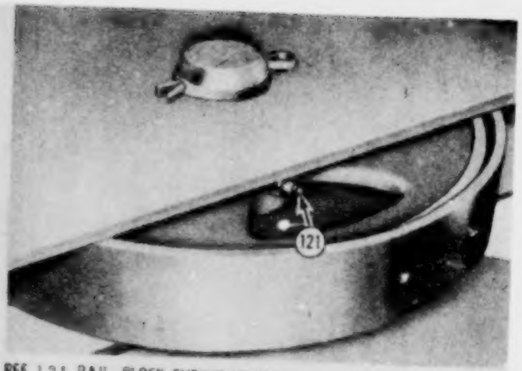
REF 118 BOOM TO BUCKET HINGE PINS
REF 119 CABLE DRAG ROLLERS

THC 5-3810-207-10-50 (20)

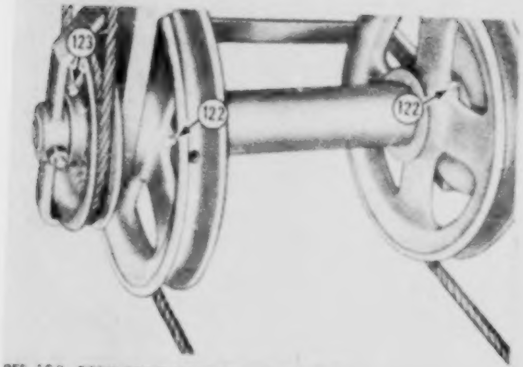
References 110 through 113 and 115 through 119
Figure 50—Continued.



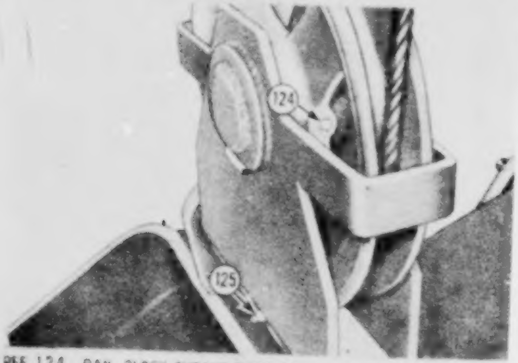
REF. 120 BAIL BLOCK CABLE ROLLERS



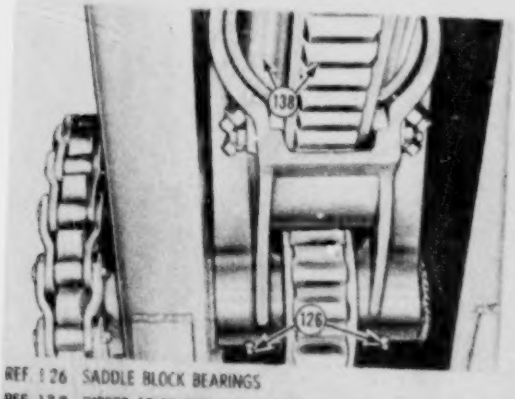
REF. 121 BAIL BLOCK SHEAVE BUSHING



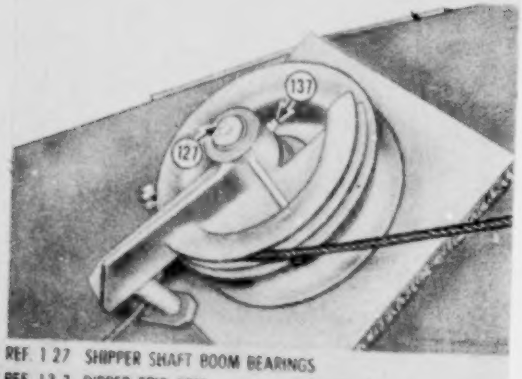
REF. 122 BOOM POINT HOIST SHEAVE BUSHING
REF. 123 BOOM HOIST SHEAVE BUSHING



REF. 124 BAIL BLOCK SHEAVE BUSHING
REF. 125 BAIL BLOCK HINGE PIN BUSHING



REF. 126 SADDLE BLOCK BEARINGS
REF. 138 DIPPER STICK AND RACK TEETH



REF. 127 SHIPPER SHAFT BOOM BEARINGS
REF. 137 DIPPER TRIP ARM

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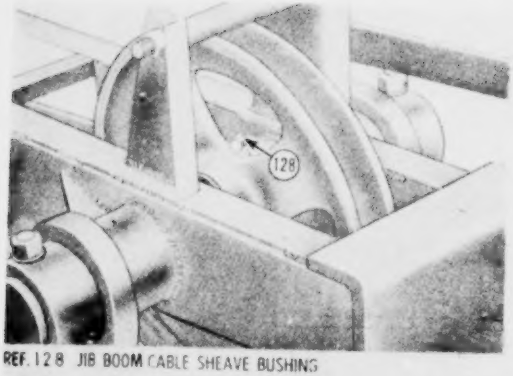
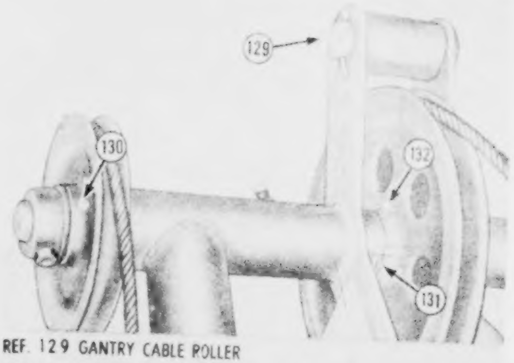
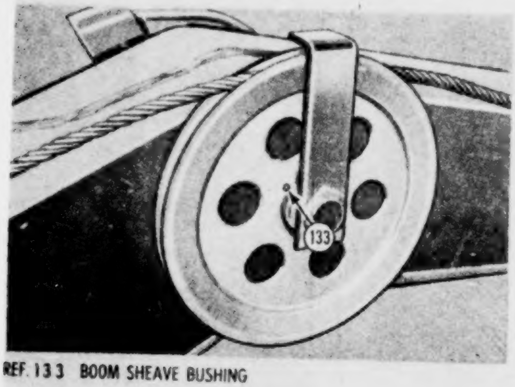
References 120 through 127, 137, and 138
Figure 50—Continued.



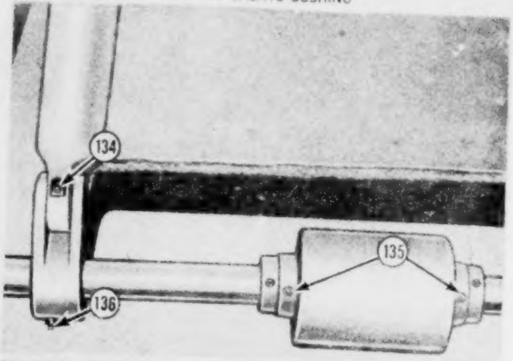
REF. 128 JIB BOOM CABLE SHEAVE BUSHING



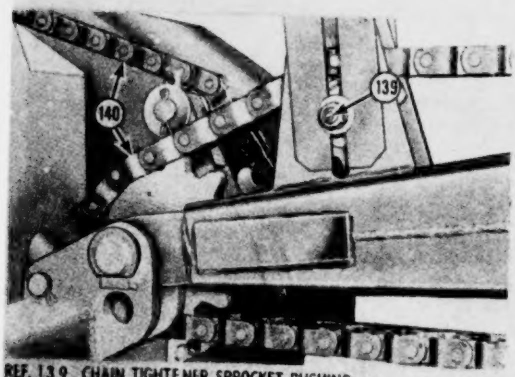
REF. 129 GANTRY CABLE ROLLER
REF. 130 GANTRY HOIST CABLE SHEAVE BUSHING
REF. 131 CABLE ANCHOR BUSHINGS
REF. 132 BOOM HOIST CABLE SHEAVE BUSHING



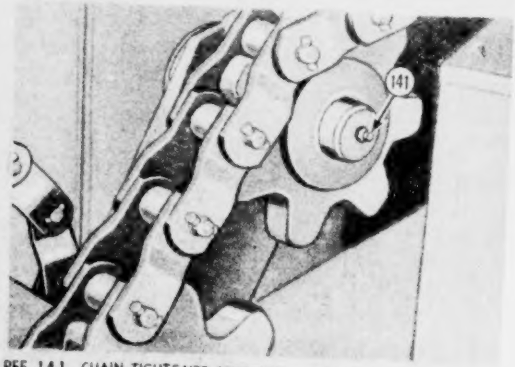
REF. 133 BOOM SHEAVE BUSHING



REF. 134 GANTRY FOOT
REF. 135 PULL CABLE ROLLER BUSHINGS
REF. 136 BOOM FOOT PIN BUSHINGS



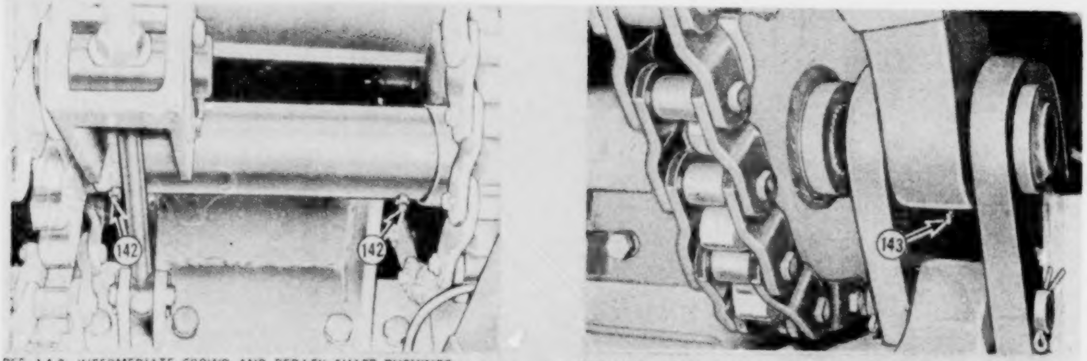
REF. 139 CHAIN TIGHTENER SPROCKET BUSHING
REF. 140 CROWD CHAINS



REF. 141 CHAIN TIGHTENER SPROCKET BUSHING

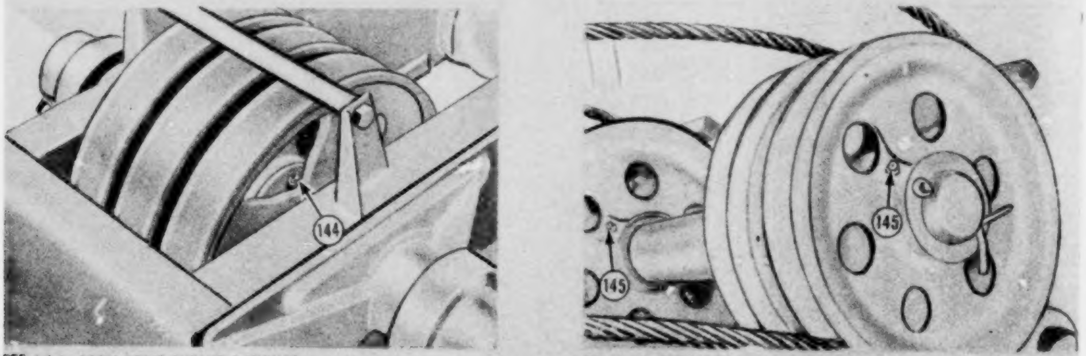
EMC 5-3810-207-10 50 (22)

References 128 through 136 and 139 through 141
Figure 50—Continued.



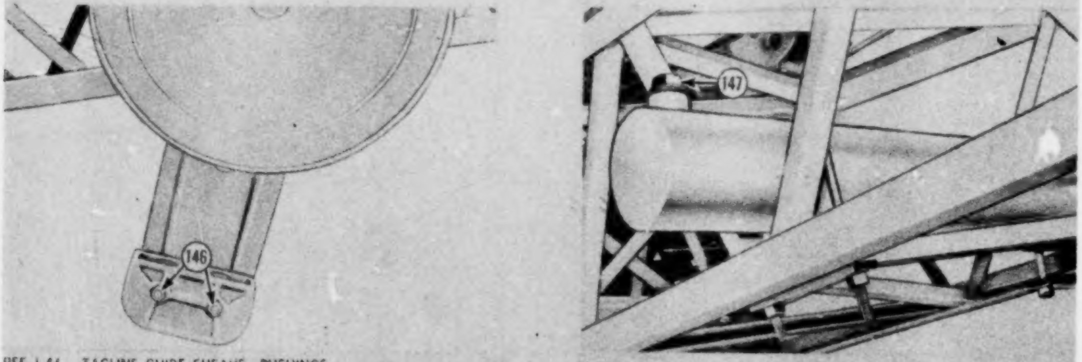
REF. 142 INTERMEDIATE CROWD AND RERACK SHAFT BUSHINGS

REF. 143 BOOM FOOT PIN BUSHINGS



REF. 144 BOOM POINT SHEAVE BUSHINGS

REF. 145 SPREADER SHEAVE BUSHINGS

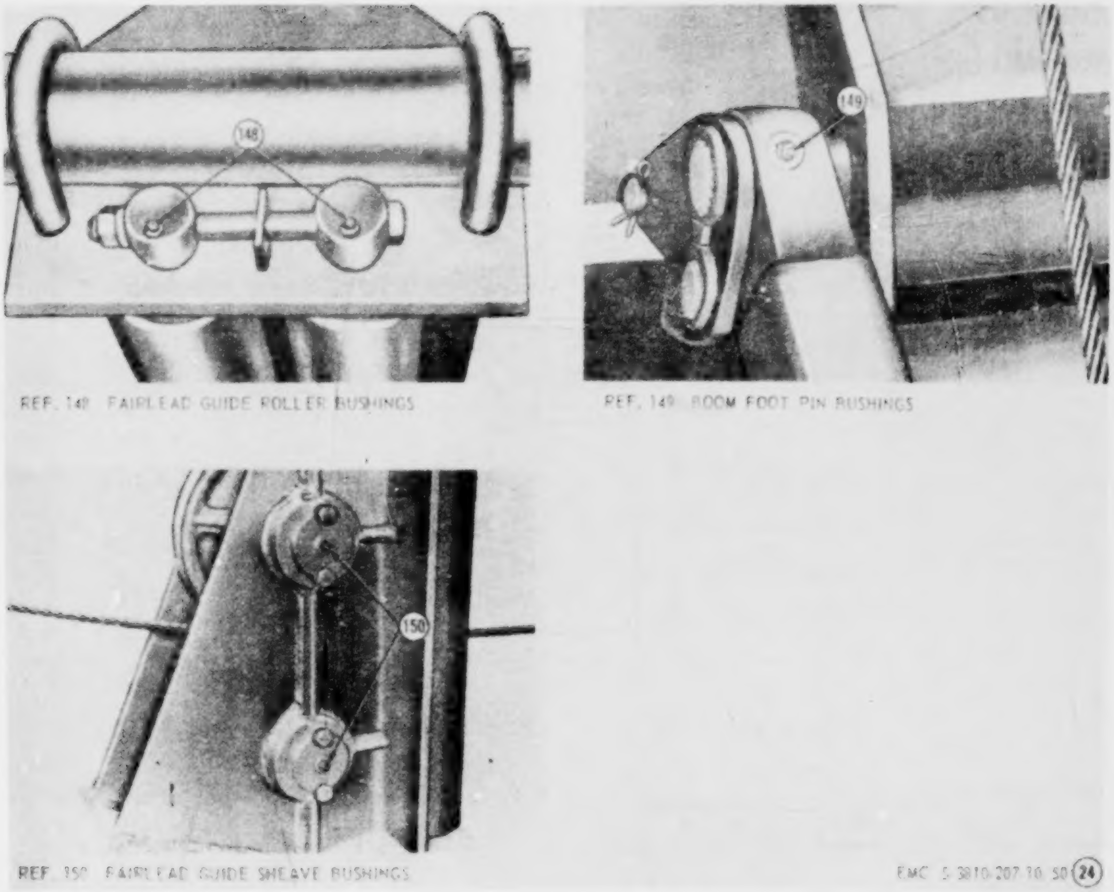


REF. 146 TAGLINE GUIDE SHEAVE BUSHINGS

REF. 147 TAGLINE BARREL FILL, LEVEL AND DRAIN PLUG

EMC 5-3810-207-10/50(22)

References 142 through 147
Figure 50—Continued.



REF. 148 FAIRLEAD GUIDE ROLLER BUSHINGS

REF. 149 BOOM FOOT PIN BUSHINGS

REF. 150 FAIRLEAD GUIDE SHEAVE BUSHINGS

EMC 5-3810-207-10-50 (24)

References 148 through 150
Figure 50—Continued.

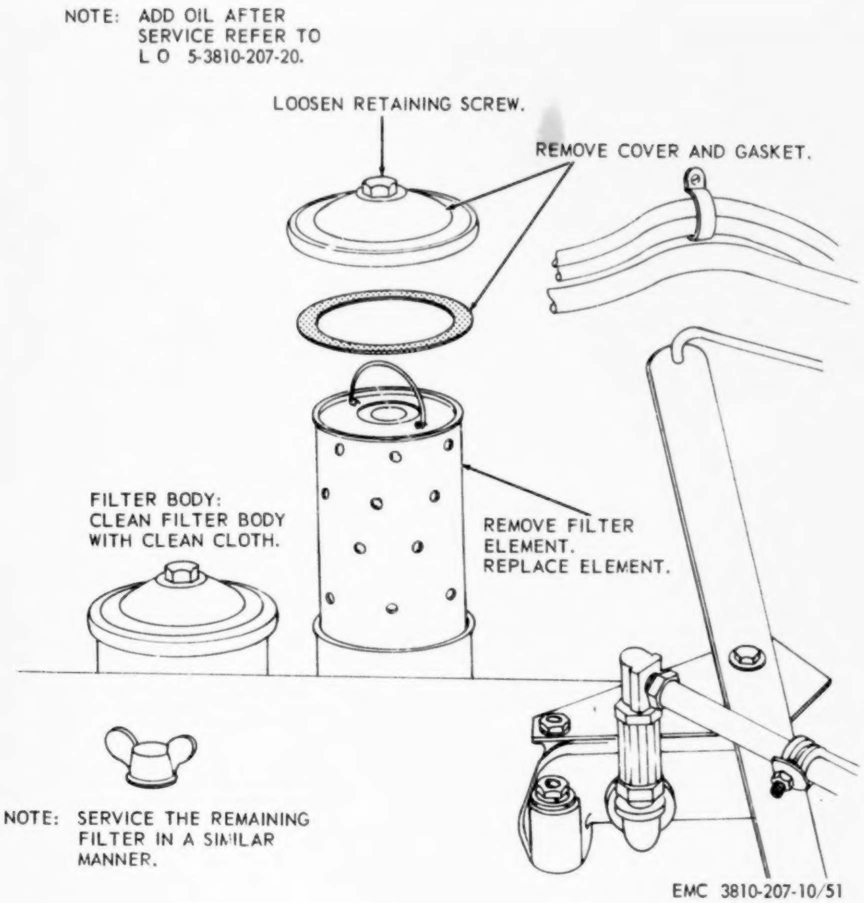

NOTE: ADD OIL AFTER SERVICE REFER TO L O 5-3810-207-20.
LOOSEN RETAINING SCREW.
REMOVE COVER AND GASKET.
FILTER BODY: CLEAN FILTER BODY WITH CLEAN CLOTH.
REMOVE FILTER ELEMENT. REPLACE ELEMENT.
NOTE: SERVICE THE REMAINING FILTER IN A SIMILAR MANNER.
EMC 3810-207-10/51

Figure 51. Carrier engine oil filter service.

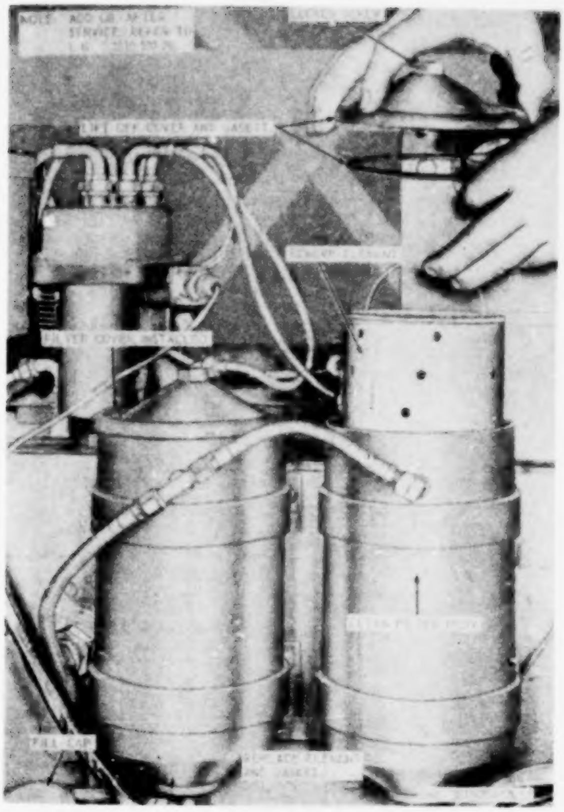


Figure 52. Crane engine oil filter service.

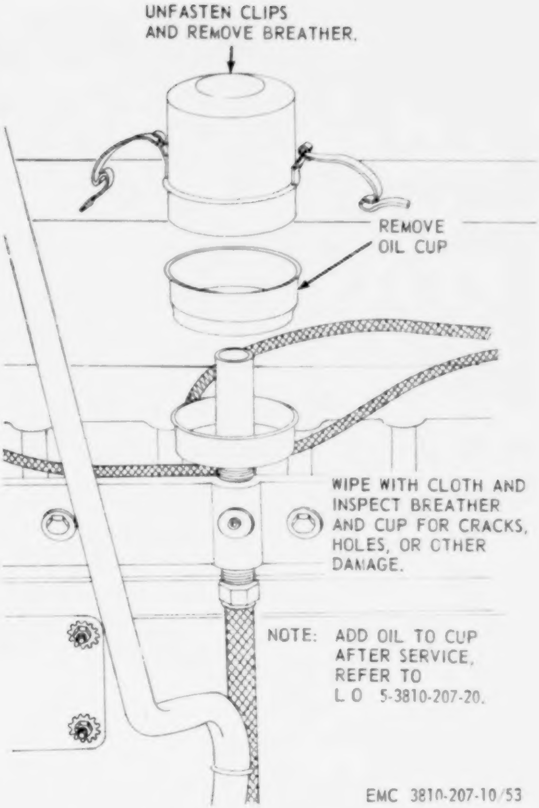

UNFASTEN CLIPS AND REMOVE BREATHER.
REMOVE OIL CUP
WIPE WITH CLOTH AND INSPECT BREATHER AND CUP FOR CRACKS, HOLES, OR OTHER DAMAGE.
NOTE: ADD OIL TO CUP AFTER SERVICE, REFER TO L O 5-3810-207-20.
EMC 3810-207-10/53

Figure 53. Carrier engine crankcase breather service.

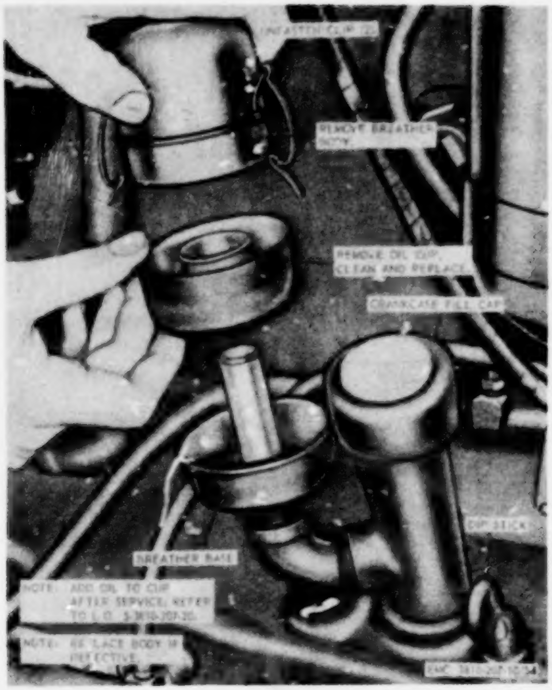

UNFASTEN CLIP (2)
REMOVE BREATHER BODY.
REMOVE OIL CUP, CLEAN AND REPLACE.
CRANKCASE FILL CAP
DIP STICK
BREATHER BASE
NOTE: ADD OIL TO CUP AFTER SERVICE; REFER TO L O 5-3810-207-20.
NOTE: REPLACE BODY IF DEFECTIVE.
EMC 3810-207-10/54

Figure 54. Crane engine crankcase breather service.

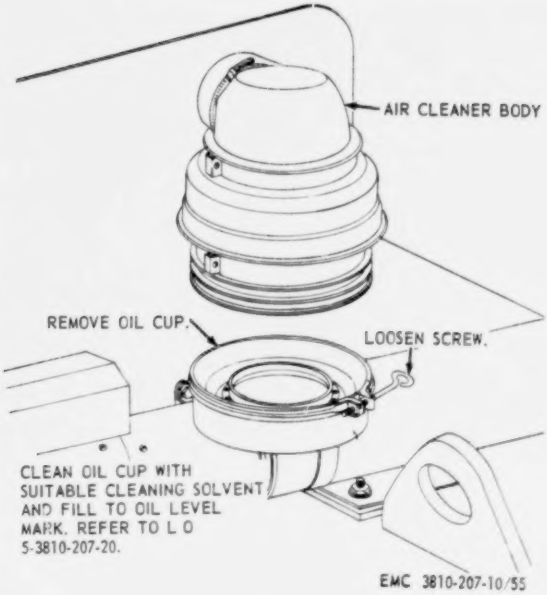
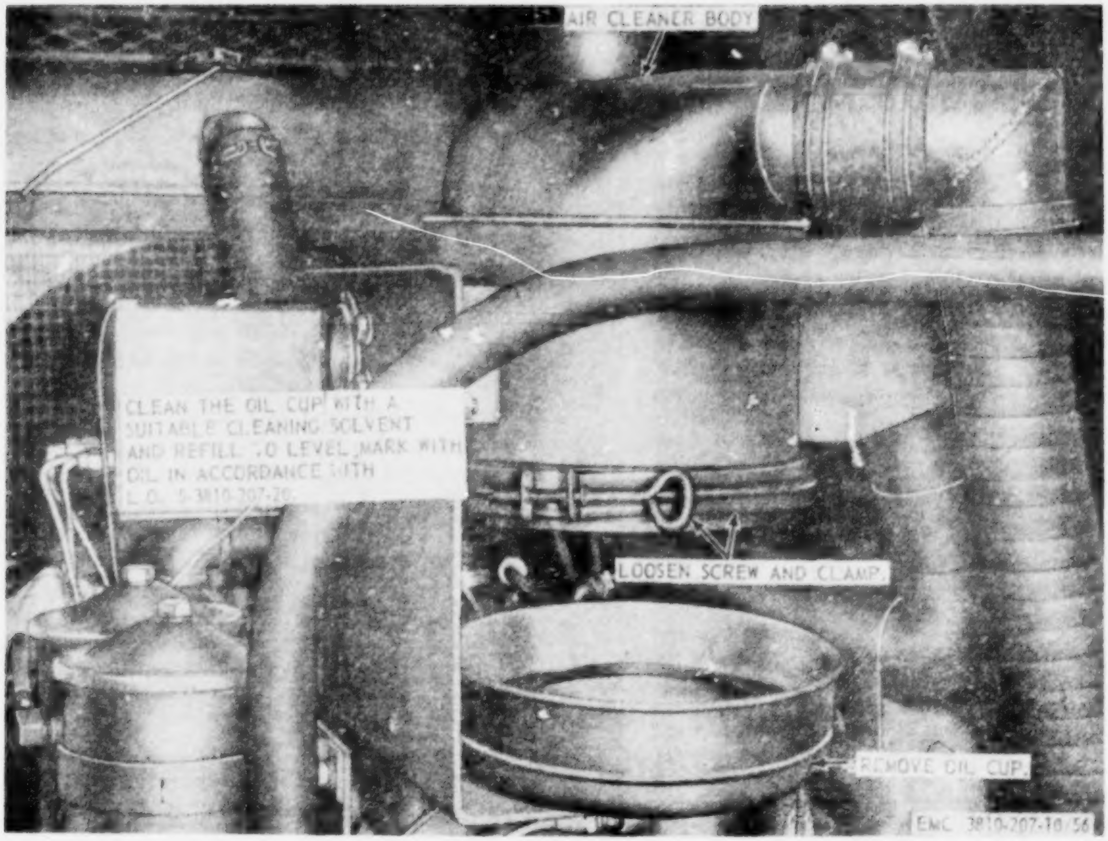

AIR CLEANER BODY
REMOVE OIL CUP.
LOOSEN SCREW.
CLEAN OIL CUP WITH SUITABLE CLEANING SOLVENT AND FILL TO OIL LEVEL MARK. REFER TO L O 5-3810-207-20.
EMC 3810-207-10/55

Figure 55. Carrier engine air cleaner service.



CLEAN THE OIL CUP WITH A SUITABLE CLEANING SOLVENT AND REFILL TO LEVEL MARK WITH OIL IN ACCORDANCE WITH L.O. 5-3810-207-20.

LOOSEN SCREW AND CLAMP.

REMOVE OIL CUP.

Figure 56. Crane engine air cleaner service.

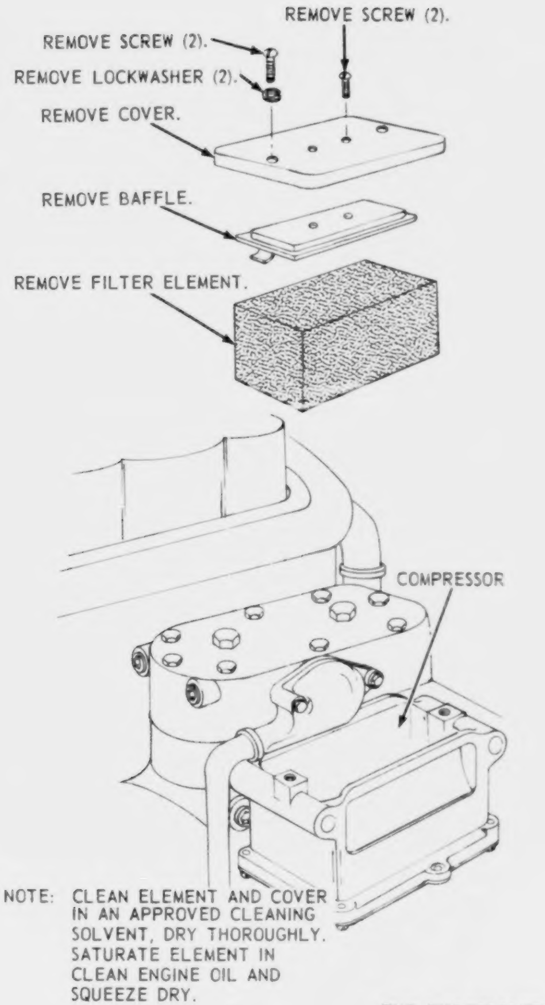


Figure 57. Carrier engine air compressor breather service.

Section III. PREVENTIVE MAINTENANCE SERVICES

53. General

To insure that the equipment is ready for operation at all times, it must be inspected systematically before operation, during operation, and after operation, so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance services shall be performed before operation. Defects discovered during operation of the unit shall be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noticed during operation which would damage the equipment if operation were continued. After-operation services shall be performed by the operator after every operating period. After-operation services shall be performed at intervals based on the normal operations of the equipment. Reduce interval to compensate for abnormal conditions. Responsibility for performance of preventive maintenance services rests not only with the operator but also with the entire chain of command from section chief to commanding officer (AR 750–5).

Note. Record all uncorrected deficiencies on DA Form 2404.

54. Daily Maintenance Service and Inspection Procedures

a. General. The specific daily inspections and services that are to be performed by the operator or crew are listed below as items 1 through 20 and are to be performed at indicated intervals.

b. Specific Service and Inspection Instructions. Specific service and inspection instructions are contained in the appropriate referenced paragraphs below and in figure 58. The illustrated inspection and service intervals are indicated by an X in the appropriate block on each illustration as follows.

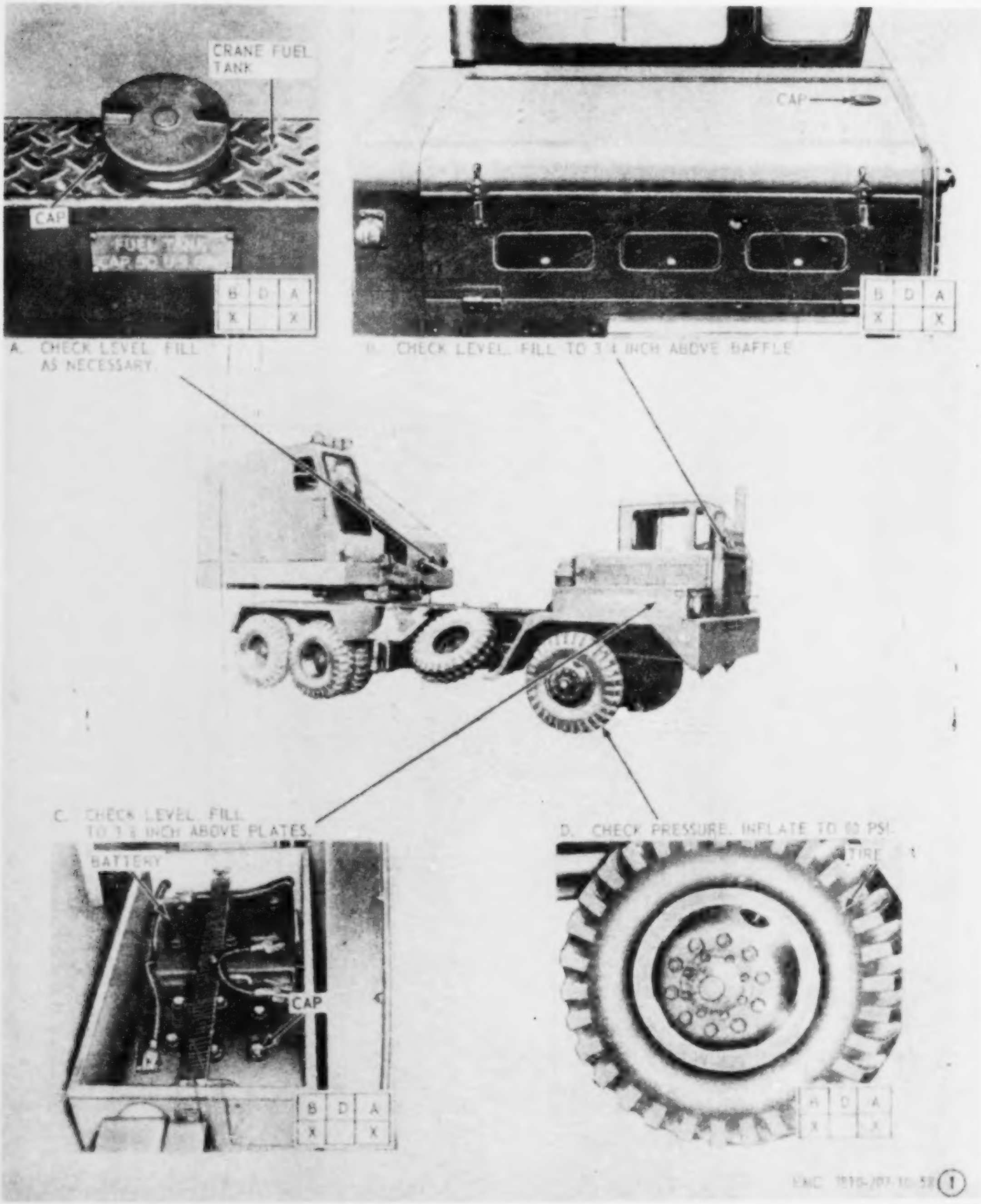
Note. Detailed instructions for the applicable maintenance service and inspection procedures are referenced by the paragraph numbers listed.

Item	Before starting engine	Par.
1	Visual inspection—make general inspection of the entire unit for cracks, breaks, damage, and loose or missing bolts and nuts. Check tire inflation. Normal tire pressure is 80 psi.	7
2	Carrier fuel tank, fuel lines, headlights, taillights, marker lights, carrier engine air cleaner. Inspect for leaks, breaks, damage, secure mounting, and proper operation. Check fuel tank fuel level.	7
3	Carrier radiator, hose, fan belts, generator belt, steering pump belt, air compressor belt. Inspect the items for wear, damage, and proper adjustment. Proper belt deflection is 3/4 to 1 inch between pulleys.	119
4	Check carrier engine oil level. Check fire extinguisher for proper operation. Inspect and check winterization equipment for breaks, damage, missing parts, leaks, and operation.	46
5	Carrier toolbox and tools, windshield wiper blade and arm. Inspect the items for wear, breaks, and missing parts.	116
6	Tools and equipment—check all tools and equipment assigned to the crane-shovel making sure they are serviceable, clean, and properly stowed or mounted.	50
7	Crane engine, crankcase, radiator hose, lines and fittings, fan belts, generator belt. Inspect these items for leaks, wear, breaks, and adjustment. Check levels. Fan and generator belt deflection is 1/4 to 1/2 inch between pulleys.	121
8	Boom hoist brake, hoist brake, swing brake, crowd brake, boom hoist clutch, hoist clutch, swing clutches, crowd and retract clutches, master clutch. Inspect these items for wear, breaks, damage, and adjustment.	123–135
9	Boom hoist powerdown lubricating oil level, hydraulic control cylinders. Inspect the items for leaks and damage.	93
10	Jaw clutches, linkage, and pins. Inspect these items for wear, damage, and operation.	137–142
11	Winterization equipment—heater fuel pumps, filters and lines, heater controls, space and coolant heaters, heater fuel tanks. Inspect for leaks, damage, missing parts, and operation.	137–142

Item	Start engine	Par.
12	With engine running, listen for any unusual noises. Check all gages and instruments for proper operation. Normal gage reading are: Crane: Ammeter ...... +38 to 42 amp max. Coolant temperature. 180° F. Oil pressure ... 40 – 50 psi Carrier: Battery Generator indicator. In green area. Oil pressure warning light. Out with engine running. Coolant temperature. 160–180° F. Air pressure .. 80–105 psi. Oil pressure .. 50–60 psi. Coolant temperature warning light. Out with engine at normal temperature.	

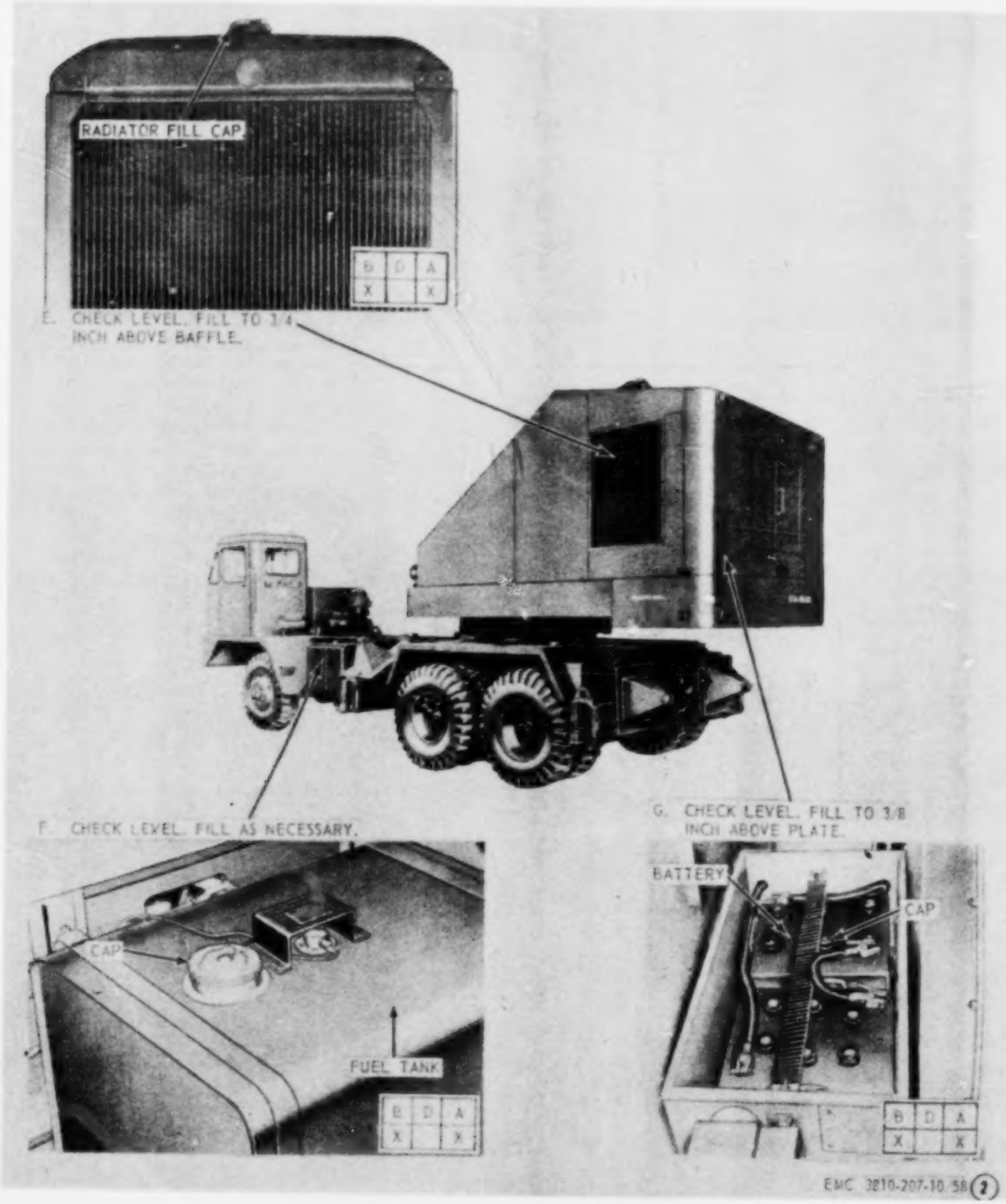
Item	During operation	Par.
13	Engine—during operation, listen for any unusual noises or loss of power while engine is under load. Look for excessive black or blue smoke.	
14	Check all forward and reverse speed ranges noticing if all shifts are smooth and without excessive vibration or unusual noises. Notice if clutch is slipping or not releasing properly and if brakes are grabbing or dragging. Check steering mechanism and all operating controls for proper operation.	
15	Check all instruments, gages, switches, lights, and horn for proper operation. Notice if working lights are properly aimed and securely mounted. At normal operating speeds, gage readings should be as given in 12 above.	
16	Crane—with machinery running, listen for unusual noises in power train, gears, power transfer case, and chain drives.	

Item	After operation	Par.
17	Temperatures—check transmission, differentials, transfer case, power transfer case assembly, boom hoist, bearing housings, and clutches. Overheated housings indicate internal maladjustment, damage, or inadequate lubrication.	
18	Leaks—inspect the engine, fuel system, hydraulic system, cooling system, transmission, differentials, transfer cases, grease seals, and gaskets for leaks.	
19	Check identification plates, paint, and marking for condition and secure mounting.	
20	Service and lubricate in accordance with LO 5-3810-207-20.	51


CRANE FUEL TANK
CAP
FUEL TANK CAP. 50 U.S. GAL
B D A
X X
A. CHECK LEVEL. FILL AS NECESSARY.
CAP
B D A
X X
B. CHECK LEVEL. FILL TO 3/4 INCH ABOVE BAFFLE
C. CHECK LEVEL. FILL TO 3/8 INCH ABOVE PLATES.
BATTERY
CAP
B D A
X X
D. CHECK PRESSURE. INFLATE TO 60 PSI.
TIRE
B D A
X X
EMC 3810-207-10-58 ①

B—Before operation
D—During operation
A—After operation

Figure 58. Daily maintenance and inspection procedures.


RADIATOR FILL CAP
B D A
X X
E. CHECK LEVEL. FILL TO 3/4 INCH ABOVE BAFFLE.
F. CHECK LEVEL. FILL AS NECESSARY.
CAP
FUEL TANK
B D A
X X
G. CHECK LEVEL. FILL TO 3/8 INCH ABOVE PLATE.
BATTERY
CAP
B D A
X X
EMC 3810-207-10/58 ②

References E through G

Figure 58—Continued.

Section IV. TROUBLESHOOTING

55. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the crane and its components. Each trouble symptom stated is followed by a list of probable causes of the trouble. The possible remedy recommended is described opposite the probable cause. Any operational trouble beyond the scope of the operator or crew shall be reported to organizational maintenance.

56. Carrier Engine Will Not Start

Probable cause	*Possible remedy*
Lack of fuel	Fill fuel tank.
Clogged carburetor screen.	Service carburetor screen (par. 100).
Engine temperature too low.	Use engine heater (par. 43).

57. Carrier Engine Hard to Start

Probable cause	*Possible remedy*
Air cleaner clogged	Service air cleaner (par. 52)
Engine temperature too low.	Use engine heater (par. 43).

58. Carrier Engine Starts but Will Not Continue to Run

Probable cause	*Possible remedy*
Air cleaner clogged	Service air cleaner (par. 52).
Carburetor screen clogged.	Service carburetor screen (par. 100).
Inadequate fuel supply	Fill fuel tank.

59. Carrier Engine Overheats

Probable cause	*Possible remedy*
Coolant level low	Fill cooling system (par 118).
Hose leaking	Tighten connections (par. 7).
Fan belt slipping	Adjust fan belt (par. 119).
Engine overloaded	Reduce engine load.
Oil supply low	Add oil (LO 5–3810–207–20).

60. Carrier Engine Lacks Power

Probable cause	*Possible remedy*
Air cleaner clogged	Service air cleaner (par. 52)
Clogged carburetor screen.	Clean carburetor screen (par. 100).
Carburetor out of adjustment.	Adjust carburetor (par. 102).

61. Carrier Engine Exhaust Smokes Excessively

Probable cause	*Possible remedy*
Crankcase oil level too high.	Drain oil until proper level is obtained (LO 5–3810–207–20).
Fuel mixture too rich	Adjust carburetor (par. 102).
Too much oil in air cleaner.	Service air cleaner (par. 52).

62. Carrier Does Not Steer Properly

Probable cause	*Possible remedy*
Low air pressure in tires	Inflate tires to 80 pounds pressure.
Hydraulic oil low	Fill reservoir to proper level (LO 5–3810–207–20).
Hydraulic pump belt loose.	Adjust belt (par. 94).

63. Headlights Fail

Probable cause	*Possible remedy*
Loose wiring connectings	Tighten connections (par. 7).
Lamp burned out	Report to organizational maintenance.
Fuse burned out	Replace fuse.

64. Lights Dim

Probable cause	*Possible remedy*
Lenses dirty	Clean lenses.
Loose wiring connections	Tighten connections (par. 7).
Insufficient charge going into battery.	Tighten loose battery lugs (par. 7).

65. Ammeter Inoperative

Probable cause	*Possible remedy*
Battery cables loose	Tighten lug clamp connections (par. 7).
Excessive corrosion or oxidation on terminals.	Clean terminals and coat with a light film of grease (par. 7).
Broken fan belt	Report to organizational maintenance.

66. Excessive Noise and Transfer Case Overheating

Probable cause	*Possible remedy*
Insufficient lubricant	Fill to level with proper lubricant (LO 5-3810-207-20).
Improper lubricant	Drain and fill with proper lubricant (LO 5-3810-207-20).

67. Front Axle Drive and Differentials Noisy and Overheat

Probable cause	*Possible remedy*
Insufficient lubricant	Fill to level with proper lubricant (LO 5-3810-207-20).
Improper lubricant	Drain and fill with proper lubricant (LO 5-3810-207-20).

68. Crane Engine Fails to Start

Probable cause	*Possible remedy*
Lack of fuel	Fill fuel tank.
Engine temperature too low.	Use engine heater (par. 45).
Overchocking or flooding	Let the starter turn the engine while throttle is wide open.
Fuel sediment bowl and screen clogged.	Service fuel sediment bowl and screen (par. 101).
Air cleaner clogged	Service air cleaner (par. 52).

69. Crane Engine Hard to Start

Probable cause	*Possible remedy*
Air cleaner clogged	Service air cleaner (par. 52).
Engine temperature too low.	Use engine heater (par. 45).

70. Crane Engine Starts but Will Not Continue to Run

Probable cause	*Possible remedy*
Air cleaner clogged	Service air cleaner (par. 52).
Inadequate fuel supply	Fill fuel tank.
Carburetor out of adjustment.	Adjust carburtor (par. 103).

71. Crane Engine Lacks Power

Probable cause	*Possible remedy*
Air cleaner clogged	Service air cleaner (par. 52).
Clogged fuel pump screen.	Clean fuel pump screen.
Carburetor out of adjustment.	Adjust carburetor (par. 103).

72. Revolving Frame Will Not Swing

Probable cause	*Possible remedy*
Swing lock engaged	Release swing lock (par. 28).
Swing brake engaged	Release swing brake (par. 28).

73. Boom Will Not Lower

Probable cause	*Possible remedy*
Boom hoist pawl engaged	Release the boom hoist pawl (par. 28).
Boom hoist clutch too loose.	Adjust clutch (par 132).

74. Cables Wear Rapidly

Probable cause	*Possible remedy*
Sheaves not turning	Lubricate sheaves (LO 5-3810-207-20).
Cables lack lubricant	Lubricate cable (LO 5-3810-207-20).

75. Cables Jump Sheaves

Probable cause	*Possible remedy*
Excessive slack in cables.	Keep cables tight.
Improper reeving	Reeve as instructed in paragraphs 9–12, 16 and 17.

76. Crane Will Not Lift Rated Capacity

Probable cause	*Possible remedy*
Incorrect reeving	Check reeving (par. 10).
Incorrect boom angle	Raise boom to correct angle (Table II).
Clutches not properly adjusted.	Adjust clutches (pars. 130, 131, 132).

77. Dragline Bucket Will Not Dump Properly

Probable cause	*Possible remedy*
Dump cable off dump block sheave.	Reeve cable on sheave (par. 16).
Dump cable not properly adjusted.	Adjust dump cable (par. 16).

78. Clamshell Bucket Will Not Take Proper Bite

Probable cause	*Possible remedy*
Too much tension on holding line.	Release tension (par. 14).

Rate of bucket drop too slow.	Drop bucket faster (par. 14).
Improper clutch adjustment.	Adjust clutches (pars. 130, 131, 132).

79. Clamshell Bucket Fails to Open

Probable cause	*Possible remedy*
Closing line jammed in sheaves.	Lower bucket and free line (par. 14).
Closing line too short	Install correct length of cable (pars. 4 and 14).

80. Shovel Retract Mechanism not Operating Properly

Probable cause	*Possible remedy*
Too much play in retract assembly.	Adjust crowd chain (par. 9).
Dipper stick loose in saddle block.	Adjust saddle block (par. 9).

81. Shovel Bucket Does Not Dig Properly

Probable cause	*Possible remedy*
Improper bucket pitch	Adjust bucket pitch (par. 9).
Tooth points worn	Replace teeth points (par. 143).

82. Shovel Bucket Door Will Not Stay Closed

Probable cause	*Possible remedy*
Bucket door latch improperly adjusted.	Adjust door latch (par. 9).
Dipper trip cable too short.	Install correct length of cable and adjust properly (par. 9).

83. Crane Engine Winterization Heater Does Not Operate Properly

Probable cause	*Possible remedy*
Fuel pump filter clogged.	Service filter (par. 137).
Fuel pump screen clogged.	Clean or replace screen (par. 138).

84. Carrier Personnel Heater Does Not Operate Properly

Probable cause	*Possible remedy*
Fuel pump filter clogged.	Replace filter (par. 140).
Heater not producing enough heat.	Set the thermostat control to a higher temperature (par. 44).

Section V. FIELD EXPEDIENT REPAIRS

85. General

Operational troubles may occur while the crane is operating in the field where supplies and repair parts are not available and normal corrective action cannot be performed. When this condition exists, the following expedient remedies may be used during emergencies, upon the decision of the unit commander. Equipment so repaired must be removed from operation as soon as possible and properly repaired before being placed in operation again.

86. Fuel Filter Clogged

Trouble	*Expedient remedy*
Dirt in fuel	Remove fuel filter and screens.
Defective fuel filters.	Bypass fuel filter and connect fuel hose directly to fuel tank.

87. Engine Will Not Start

Trouble	*Expedient remedy*
Dead batteries.	Use jumper cable from batteries on adjacent equipment.

88. Engine Overheats

Trouble	*Expedient remedy*
Coolant hose broken	Tape the hose and refill with coolant and operate until new hose can be obtained, being certain to watch the temperature warning light and not allow engine to overheat.

89. Engine Does Not Respond to Governor

Trouble	*Expedient remedy*
Governor throttle linkage damaged.	Manually operate throttle linkage to control engine speed and energize governor for starting the engine.

90. Carrier Hard to Steer

Trouble	*Expedient remedy*
Belt slipping or broken on the, hydraulic steering pump.	Operate unit on manual steering until new belt is obtained.
Hydraulic hose broken on steering cylinder.	Disconnect the hydraulic pump and operate the unit with manual steering until new hose is obtained.

Section VI. HYDRAULIC OIL SYSTEM

91. General

a. Carrier. The hydraulic oil system is used as a steering aid of the carrier. It consists of a cylinder, oil lines, a hydraulic oil pump, a pump drive belt, and an oil reservoir. The oil pump and reservoir are mounted on the water pump of the carrier engine. The oil filter element is located in the oil reservoir, and filters the oil before it enters the lines and cylinder.

b. Crane. The following control levers have two hydraulic cylinders: the swing clutch control lever, primary drum clutch lever, and the power boom lever. The secondary drum clutch lever has one cylinder. The swing brake, master clutch, brake pedals, boom pawl lock, and the house lock lever do not have any hydraulic cylinders. Four of the cylinders are mounted under the floor of the operator's cab and forward of the brake pedals. From left to right they are: swing right, secondary raise, primary raise, and boom raise. The three remaining cylinders are located under the floor, to the rear of the control levers. They are from left to right: swing left, primary down, and boom down. A hole in the operator's cab floor provides for easy servicing of these cylinders.

92. Carrier Hydraulic Oil Filter Service

Service the carrier hydraulic oil filter as instructed in figure 59.

93. Crane Hydraulic Control Cylinders Service

a. Service the crane hydraulic control cylinders as instructed in figure 60.

b. Start the crane engine (par. 25).

c. Operate the crane (par. 28).

Note. If levers travel too far forward or backward it is an indication of insufficient hydraulic oil in cylinders or of linkage not properly adjusted.

94. Carrier Hydraulic Steering Pump Belt Adjustment

Adjust the hydraulic steering pump belt as instructed in figure 61.

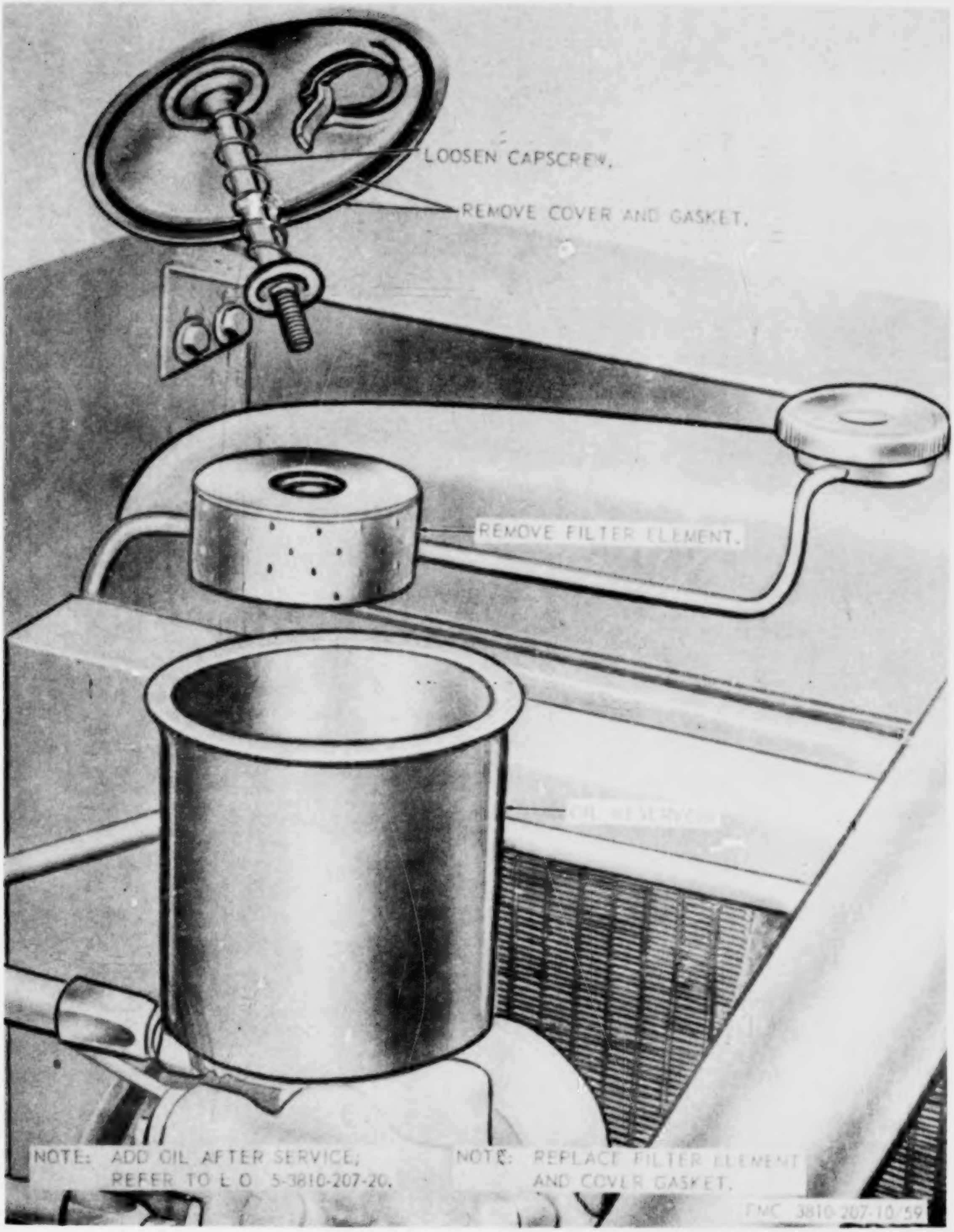

LOOSEN CAPSCREW.
REMOVE COVER AND GASKET.
REMOVE FILTER ELEMENT.
OIL RESERVOIR
NOTE: ADD OIL AFTER SERVICE; REFER TO L.O. 5-3810-207-20.
NOTE: REPLACE FILTER ELEMENT AND COVER GASKET.
EMC 3810-207-10/59

Figure 59. Carrier hydraulic filter service.

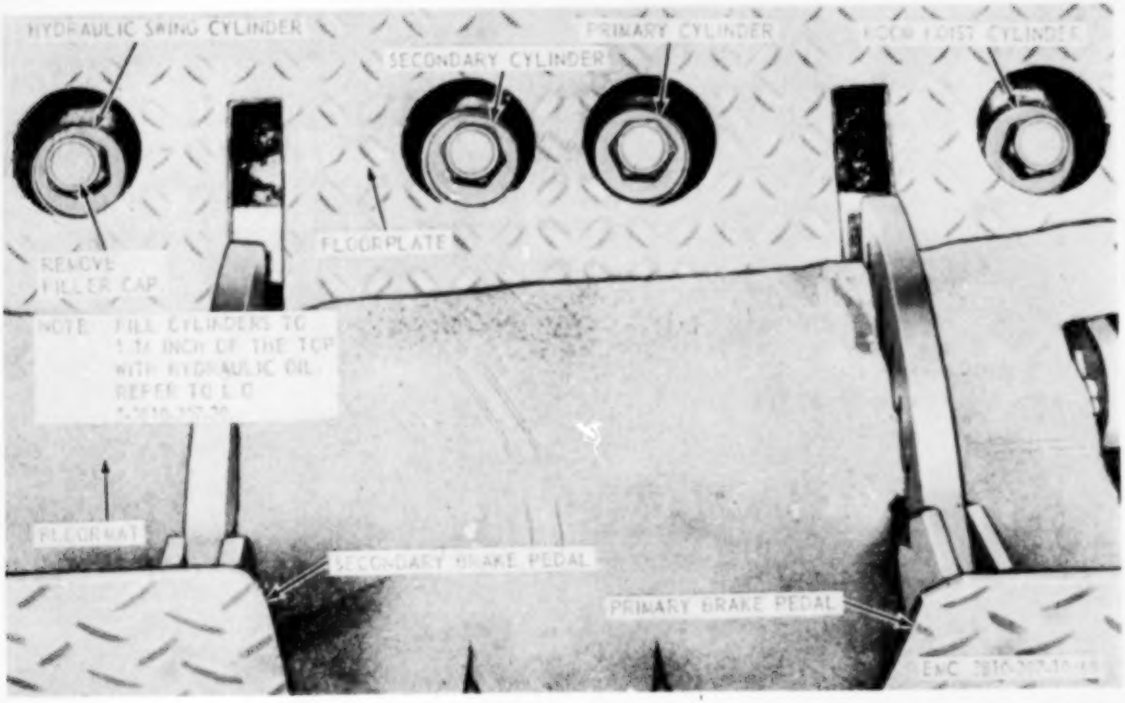


Figure 60. Crane hydraulic control cylinder service.

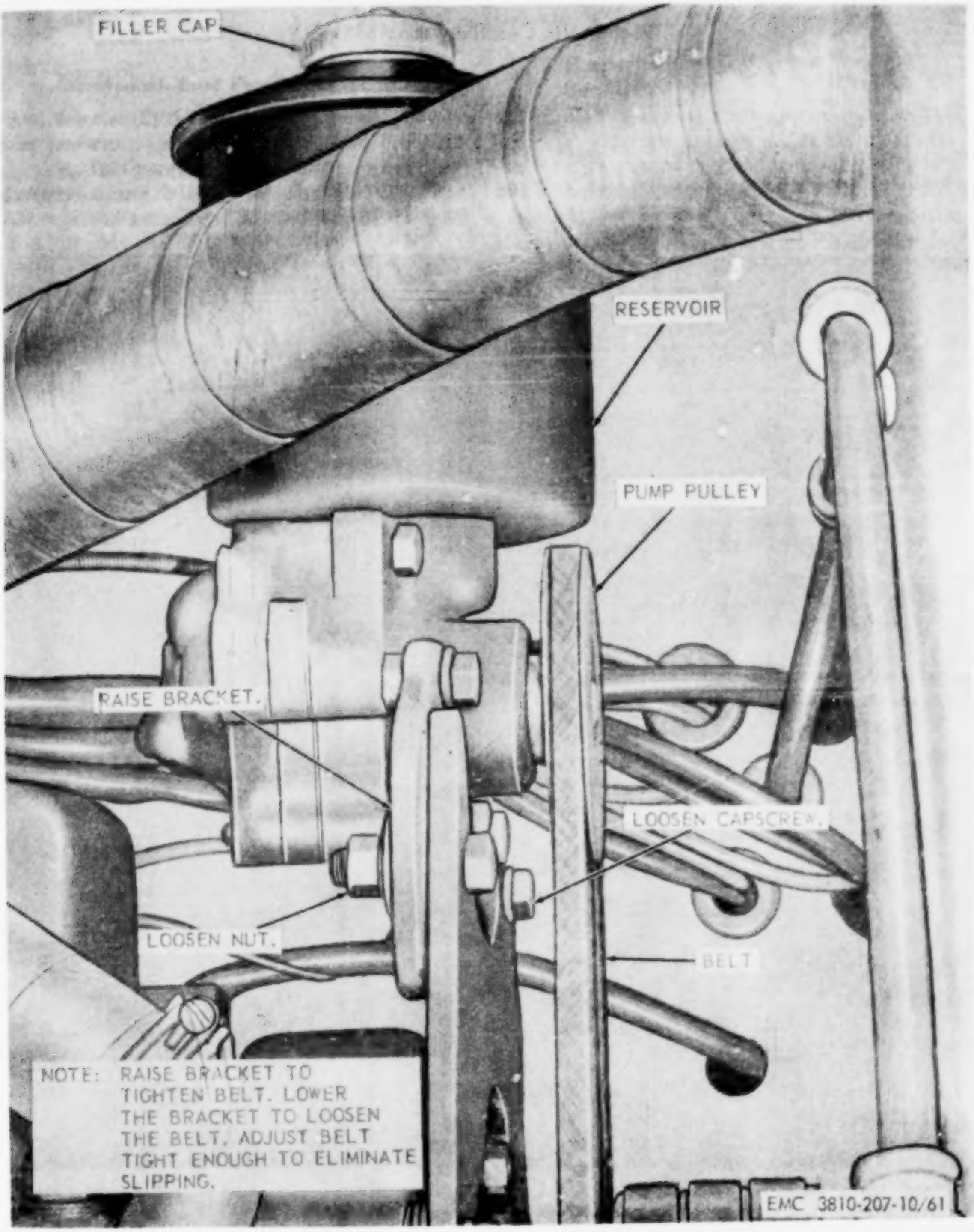

FILLER CAP
RESERVOIR
PUMP PULLEY
RAISE BRACKET.
LOOSEN CAPSCREW.
LOOSEN NUT.
BELT
NOTE: RAISE BRACKET TO TIGHTEN BELT. LOWER THE BRACKET TO LOOSEN THE BELT. ADJUST BELT TIGHT ENOUGH TO ELIMINATE SLIPPING.
EMC 3810-207-10/61

Figure 61. Carrier hydraulic steering pump belt adjustment.

Section VII. CARRIER CAB ASSEMBLY

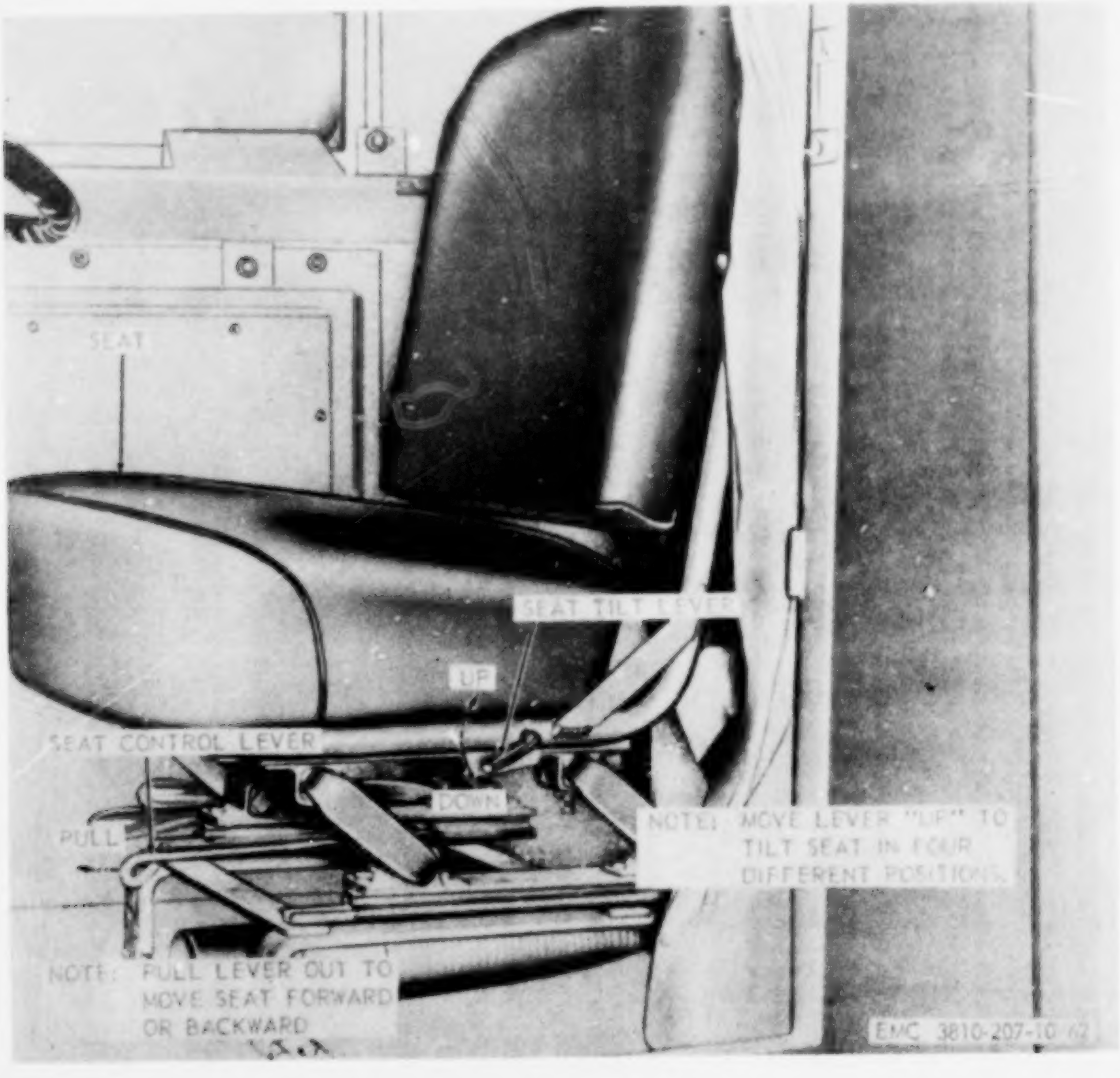
95. General

The carrier operator's seat is located in the cab, mounted at the front of the unit. The carrier operator's seat has two adjustments to permit the carrier operator maximum comfort and efficiency.

96. Carrier Operator's Seat Adjustment

a. Forward and Backward Adjustment. Adjust the carrier operator's seat forward and backward as instructed in figure 62.

b. Tilt Adjustment. Make the operator's seat tilt adjustment as instructed in figure 62.



NOTE: MOVE LEVER "UP" TO TILT SEAT IN FOUR DIFFERENT POSITIONS.

NOTE: PULL LEVER OUT TO MOVE SEAT FORWARD OR BACKWARD

Figure 62. Carrier operator's seat adjustment.

Section VIII. FUEL SYSTEMS

97. General

a. Carrier Fuel System. The fuel system of the crane carrier consists of a fuel tank, air cleaner, fuel pump, and a carburetor. The carburetor screen is located in the inlet port of the carburetor. The fuel tank is mounted on the left side of the carrier frame, forward of the outrigger. The fuel pump delivers fuel from the tank to the carburetor.

b. Crane Fuel System. The fuel system of the crane consists of a fuel tank, air cleaner, fuel pump, sediment bowl, and a carburetor. The fuel tank is located under the left-front machinery deck. The fuel tank filler cap is mounted on top of the fuel tank and extends through the machinery deck. The sediment bowl is a part of the fuel pump and is used to trap sediment before it enters the fuel pump.

98. Crane Engine Fuel Tank Service

Service the crane engine fuel tank as instructed in figure 63.

99. Carrier Engine Fuel Tank Service

Service the carrier engine fuel tank in same manner as the crane engine fuel tank.

100. Carrier Engine Carburetor Screen Service

Service the carrier engine carburetor screen as instructed in figure 64.

101. Crane Engine Fuel Sediment Bowl and Screen Service

Service the crane engine fuel sediment bowl and screen as instructed in figure 65.

102. Carrier Engine Carburetor Adjustment

a. Description. The carburetor used on the carrier engine is the downdraft type, double-venturi design. The mixture of the fuel-air for low speed idling is controlled by the air adjusting screw.

b. Adjustment. Adjust the carrier engine carburetor as instructed in figure 66.

103. Crane Engine Carburetor Adjustment

a. Description. The carburetor used on the crane engine is an updraft, double-venturi designed carburetor. The mixture of the fuel-air for low speed idling is controlled by the idle adjusting needle. The main adjusting screw controls the amount of fuel delivered for high speed engine operation.

b. Adjustment. Adjust the crane engine carburetor as instructed in figure 67.

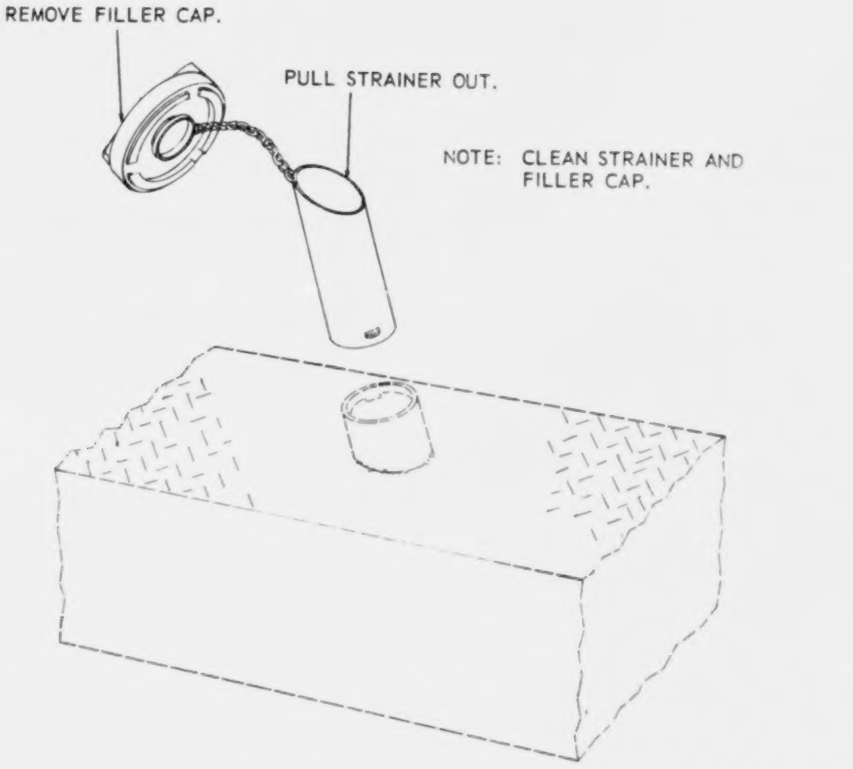


Figure 63. Crane engine fuel tank service.

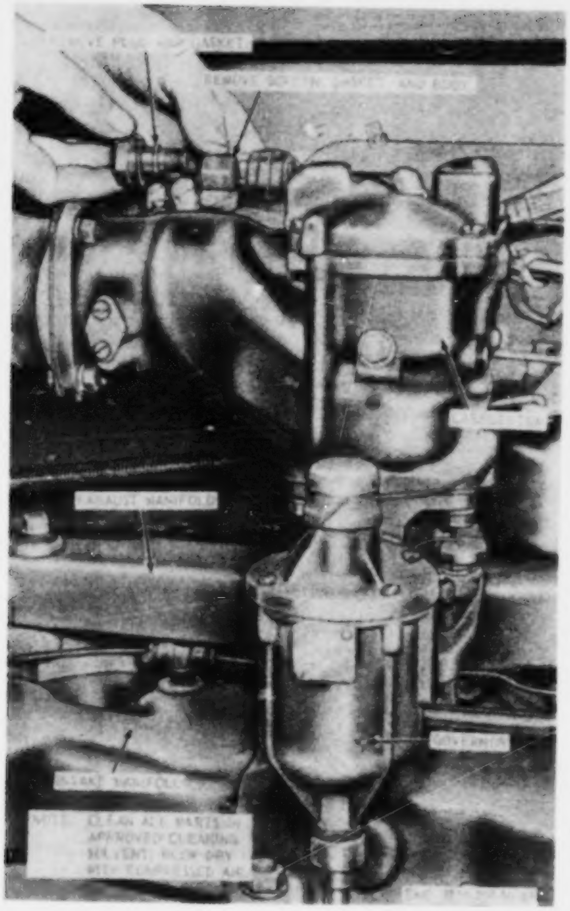

REMOVE SCREEN, GASKET, AND BODY
EXHAUST MANIFOLD
GOVERNOR
INTAKE MANIFOLD
NOTE: CLEAN ALL PARTS IN APPROVED CLEANING SOLVENT. BLOW DRY WITH COMPRESSED AIR

Figure 64. Carrier engine carburetor screen service.

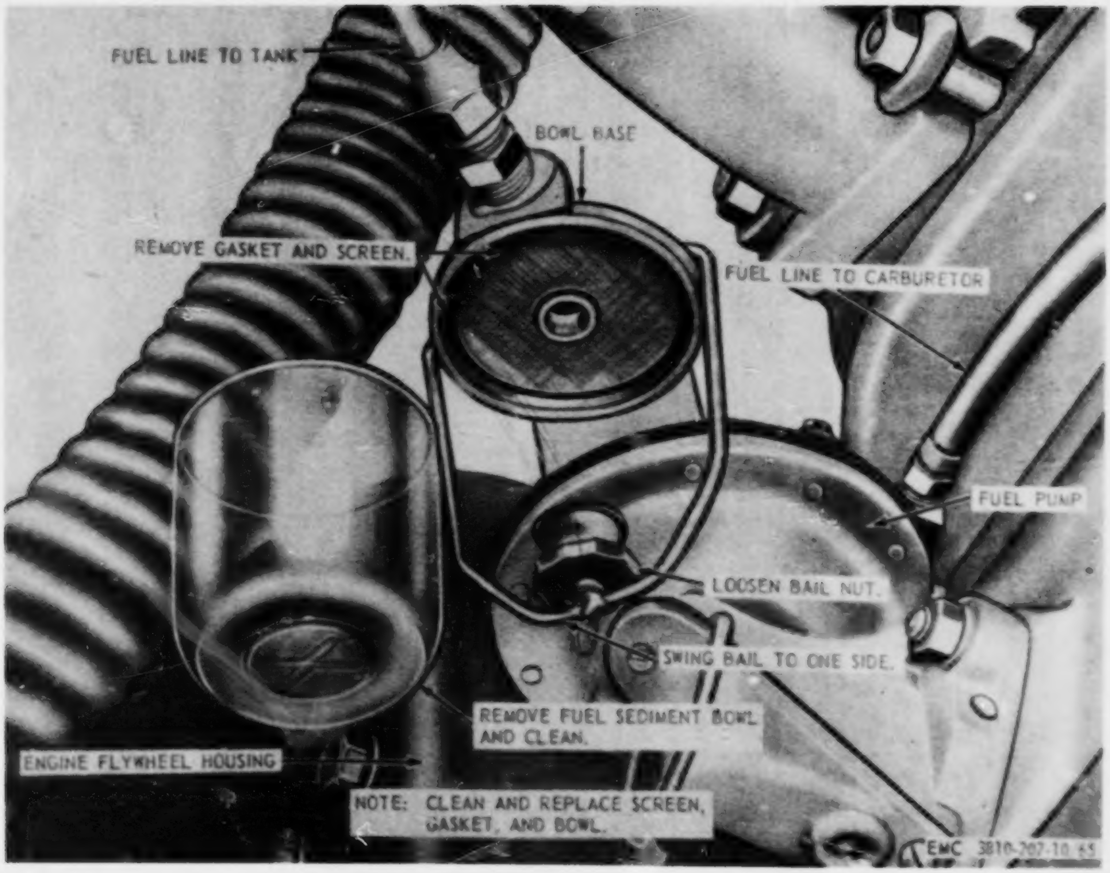
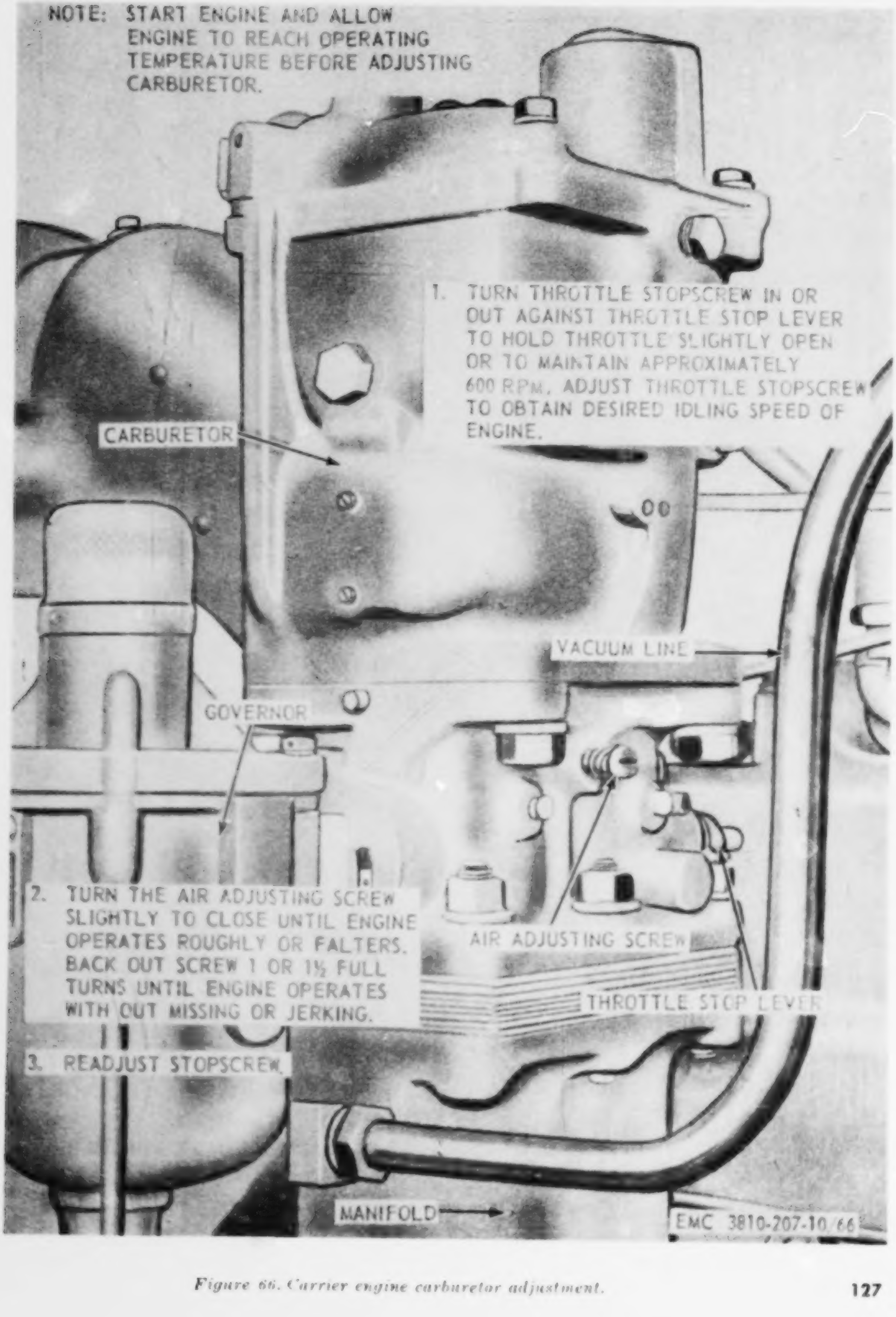


Figure 65. Crane engine fuel sediment bowl and screen service.



NOTE: START ENGINE AND ALLOW ENGINE TO REACH OPERATING TEMPERATURE BEFORE ADJUSTING CARBURETOR.

1. TURN THROTTLE STOPSCREW IN OR OUT AGAINST THROTTLE STOP LEVER TO HOLD THROTTLE SLIGHTLY OPEN OR TO MAINTAIN APPROXIMATELY 600 RPM. ADJUST THROTTLE STOPSCREW TO OBTAIN DESIRED IDLING SPEED OF ENGINE.
2. TURN THE AIR ADJUSTING SCREW SLIGHTLY TO CLOSE UNTIL ENGINE OPERATES ROUGHLY OR FALTERS. BACK OUT SCREW 1 OR 1½ FULL TURNS UNTIL ENGINE OPERATES WITH OUT MISSING OR JERKING.
3. READJUST STOPSCREW.

Figure 66. Carrier engine carburetor adjustment.

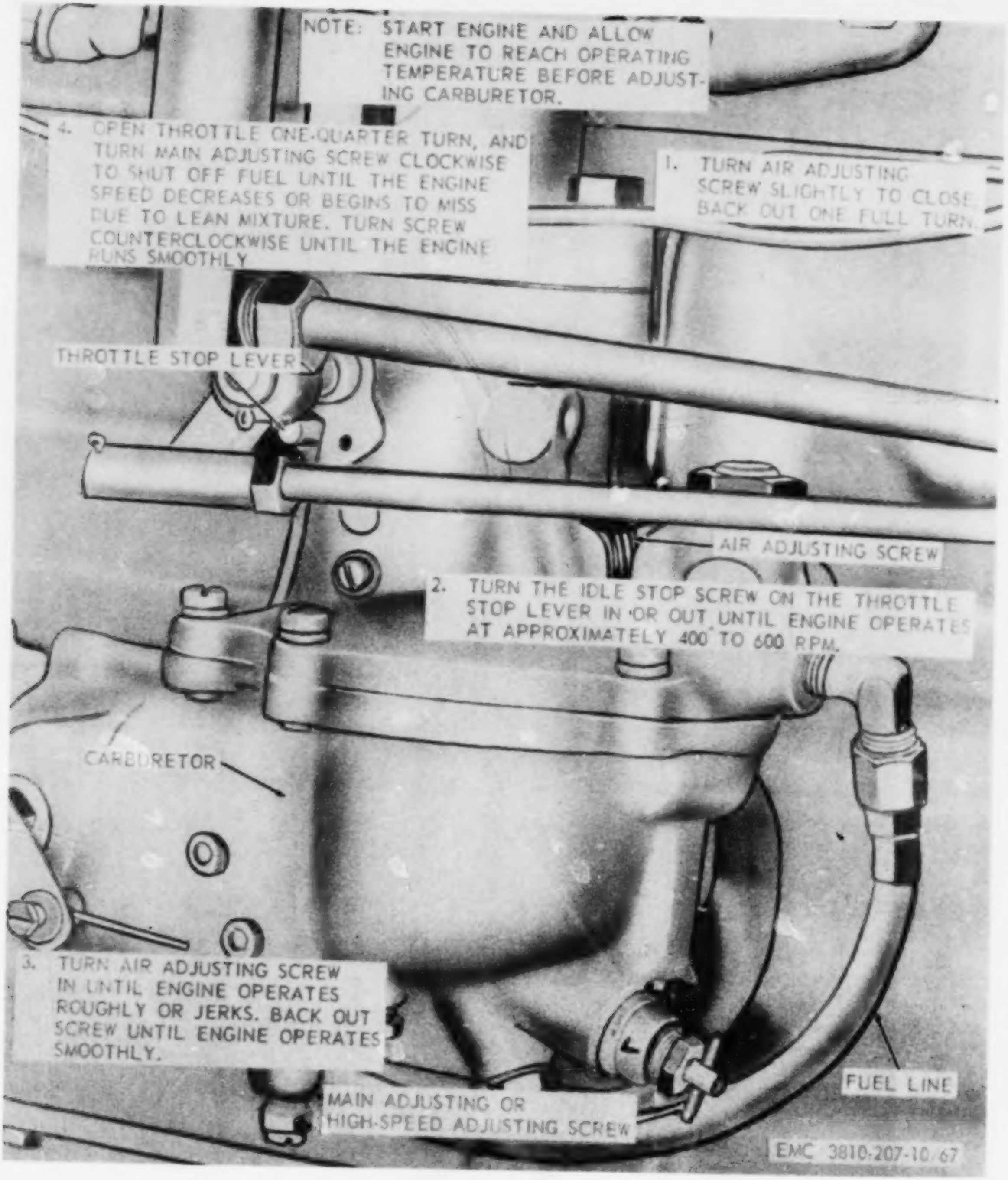

NOTE: START ENGINE AND ALLOW ENGINE TO REACH OPERATING TEMPERATURE BEFORE ADJUSTING CARBURETOR.
4. OPEN THROTTLE ONE-QUARTER TURN, AND TURN MAIN ADJUSTING SCREW CLOCKWISE TO SHUT OFF FUEL UNTIL THE ENGINE SPEED DECREASES OR BEGINS TO MISS DUE TO LEAN MIXTURE. TURN SCREW COUNTERCLOCKWISE UNTIL THE ENGINE RUNS SMOOTHLY
1. TURN AIR ADJUSTING SCREW SLIGHTLY TO CLOSE. BACK OUT ONE FULL TURN.
THROTTLE STOP LEVER
AIR ADJUSTING SCREW
2. TURN THE IDLE STOP SCREW ON THE THROTTLE STOP LEVER IN OR OUT UNTIL ENGINE OPERATES AT APPROXIMATELY 400 TO 600 RPM.
CARBURETOR
3. TURN AIR ADJUSTING SCREW IN UNTIL ENGINE OPERATES ROUGHLY OR JERKS. BACK OUT SCREW UNTIL ENGINE OPERATES SMOOTHLY.
FUEL LINE
MAIN ADJUSTING OR HIGH-SPEED ADJUSTING SCREW
EMC 3810-207-10/67

Figure 67. Crane engine carburetor adjustment.

Section IX. ELECTRICAL SYSTEMS

104. General

a. Carrier Electrical System. The carrier electrical system consists of driving lights, blackout lights, service lights, clearance lights, turn signal lights, and an interior-mounted dome light in the cab. Power for starting the engine and operation of the electrical system comes from two 12-volt batteries, connected in series with a negative ground, mounted on the front of the crane carrier to the right of the engine.

b. Crane Electrical System. The crane electrical system consists of operating floodlights, two interior dome lights, and clearance lights. Power for starting the engine and operation of the electrical system comes from two 12-volt batteries, connected in series with a negative ground, mounted behind the operator in the crane cab.

105. Carrier Low Oil Pressure Warning Light

a. Description. The low oil pressure warning light (fig. 37) is located in the upper left corner of the instrument panel and indicates low oil pressure in carrier engine.

b. Lamp Removal.

(1) Pry the lens and ring off the base.

(2) Push the lamp in and at the same time turn lamp counterclockwise. Remove lamp from base.

c. Installation.

(1) Position the lamp in the base, and push in and at the same time turn lamp clockwise until it locks in the base.

(2) Press the lens and the ring on the base.

106. Carrier Water Temperature Warning Light

a. Description. The carrier water temperature warning light (fig. 37) is located on the left side of the instrument panel under the low oil pressure warning light. It indicates to the operator that the engine coolant temperature is too high.

b. Lamp Removal and Installation. Remove the lamp in the same manner as the low oil pressure warning light (par. 105).

107. Carrier High Beam Light Indicator

a. Description. The carrier high beam light indicator (fig. 37) is located on the center of the instrument panel above and to the left of the engine water temperature gage. It indicates when the driving lights are on the high beam.

b. Lamp Removal.

(1) Turn the lens counterclockwise and remove from the carrier instrument panel.

(2) Push the lamp in and at the same time turn it counterclockwise and remove lamp from base.

c. Installation.

(1) Position the lamp in the base. Push in and at the same time turn lamp clockwise until it locks in the base.

(2) Install the lens on the base and turn clockwise to lock it in position.

108. Carrier Turn Signal Flasher Unit

a. Description. The carrier turn signals provide a flashing light to warn rear approaching and oncoming traffic of an impending turn. Flashing left front and rear lights indicate a left turn; flashing right front and rear lights indicate a right turn.

b. Testing.

(1) Push the turn indicator lever (fig. 37) up to signal a right turn.

(2) If no ticking sound is noted and the right front and rear lights are on but not flashing, the flasher unit is defective.

(3) Pull the lever down to indicate a left turn.

(4) Test the left front and rear lights in same manner as for right front and rear lights.

c. Removal. Remove the flasher unit from the flasher connector as instructed in figure 68.

d. Cleaning and Inspection. Inspect the flasher unit for cracks and broken or frayed wiring. Replace a defective flasher unit as necessary.

e. Installation. Push the new flasher unit in the flasher connector as illustrated in figure 68.

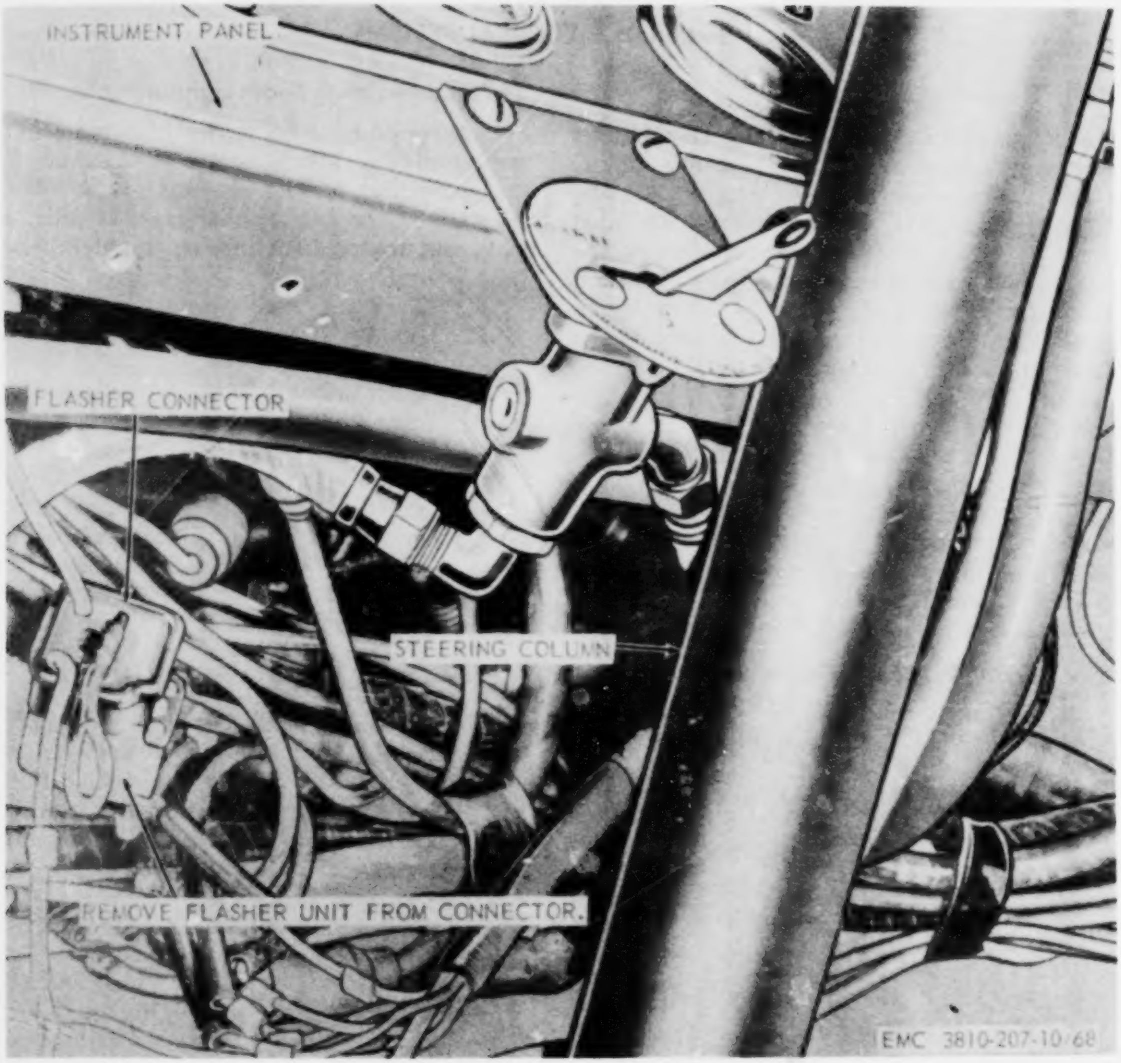


Figure 68. Carrier turn signal flasher unit, removal and installation.

109. Carrier Dashlights

a. Description. The two 24-volt dashlights (fig. 37) are located in the center of the instrument panel.

b. Lamp Removal.

(1) Turn the cover counterclockwise and remove from the base.

(2) Remove the lamp in same manner as for low oil pressure warning lamp (par. 105).

c. Installation.

(1) Install the lamp in same manner as for low oil pressure warning lamp (par. 105).

(2) Position the cover on the panel, push, and at the same time turn clockwise until locked in position.

110. Crane Windshield Wiper Blade

a. Inspection. Inspect the crane windshield wiper blade for cracks, bends, and deterioration or cuts. Replace a defective wiper blade as necessary.

b. Removal. Remove the crane windshield wiper blade as instructed in figure 69.

c. Installation. Install the crane windshield wiper blade as illustrated in figure 69.

111. Carrier Engine Batteries

Refer to figure 12 for service to the carrier engine batteries.

112. Crane Floodlamps

a. Description. The crane has four 24-volt, sealed-beam type floodlamps mounted over the operator's position on top of the crane cab and one mounted on each side of the front of the revolving frame. These floodlamps are adjustable.

b. Adjustment. Adjust the floodlamps as instructed in figure 70.

113. Crane Dashlights

a. Description. The crane dashlight (fig. 38) is located on the instrument panel between the temperature warning light and the low oil pressure warning light.

b. Lamp Removal.

(1) Pull the shield off the base.

(2) Push in on the lamp and at the same time turn counterclockwise and remove lamp from base.

c. Installation.

(1) Position the lamp in the base, push in, and at the same time turn the lamp clockwise until it locks in position.

(2) Push the shield on the base.

114. Crane Low Oil Pressure Warning Light

a. Description. The low oil pressure warning light (fig. 38) is located on the instrument panel to the right of the dashlight. It indicates low oil pressure in the crane engine.

b. Lamp Removal.

(1) Turn the lens counterclockwise and remove from base.

(2) Push in on the lamp and at same time turn counterclockwise and remove lamp.

c. Installation.

(1) Position the lamp in the base by pushing in and at the same time turning clockwise until it locks in position.

(2) Install the lens on the base by turning clockwise to tighten.

115. Crane Water Temperature Warning Light

a. Description. The crane water temperature warning light (fig. 38) is located on the instrument panel to the left of the dashlight and above the coolant temperature gage. It indicates to the operator that the engine coolant temperature is too high.

b. Lamp Removal and Installation. Remove and install the water temperature warning light in similar manner as the carrier low oil pressure warning light (par. 105).

116. Carrier Windshield Wiper Blade

a. Inspection. Inspect the wiper blade for cracks, bends, and deterioration or cuts. Replace a defective wiper blade as necessary.

b. Removal. Remove the carrier windshield wiper blade in same manner as instructed for crane windshield wiper (par. 110).

c. Installation. Install the carrier windshield wiper in same manner as instructed for crane windshield wiper blade.

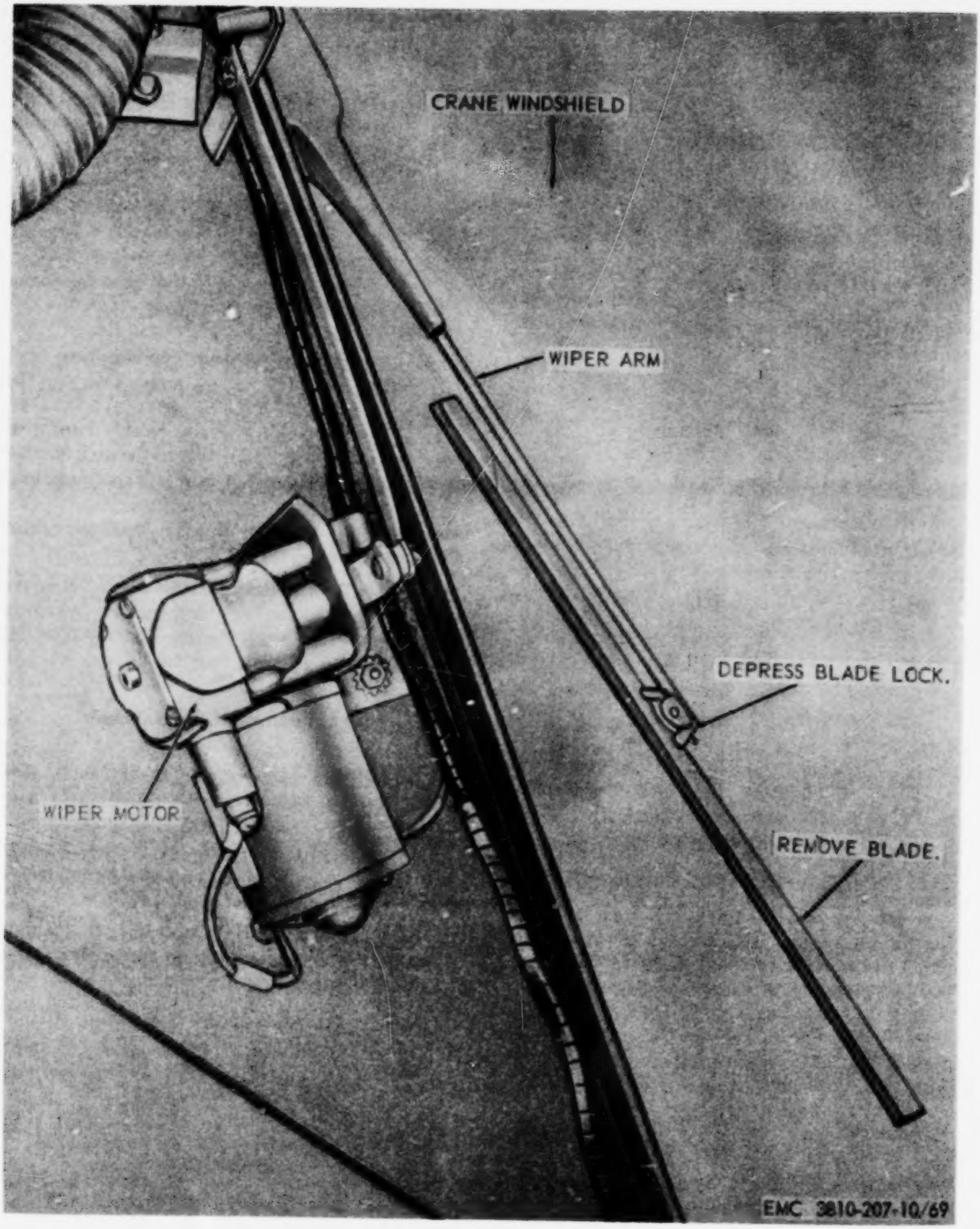
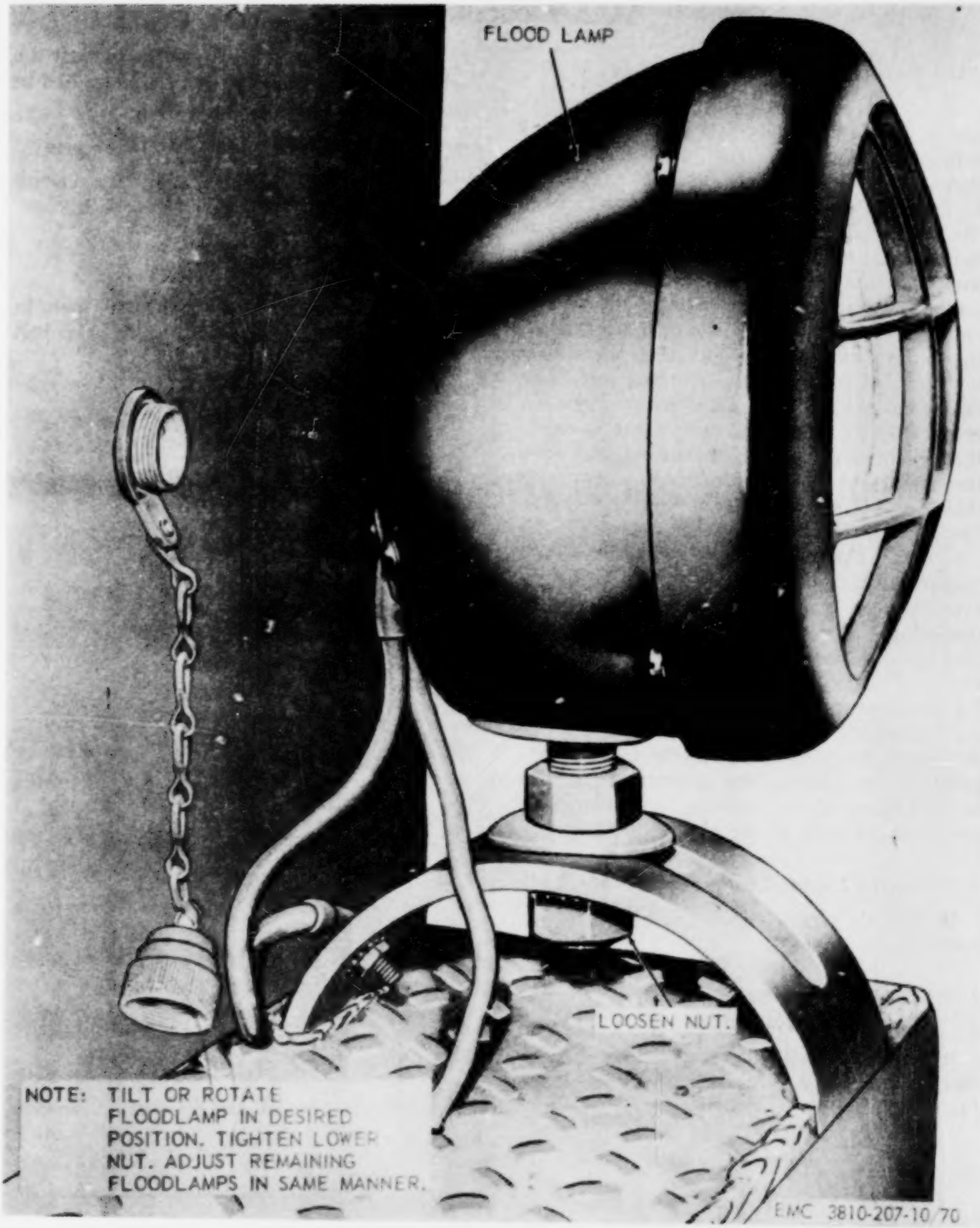


Figure 69. Crane windshield wiper blade, removal and installation.



NOTE: TILT OR ROTATE FLOODLAMP IN DESIRED POSITION. TIGHTEN LOWER NUT. ADJUST REMAINING FLOODLAMPS IN SAME MANNER.

Figure 70. Crane floodlamps adjustment.

Section X. COOLING SYSTEM

117. General

a. Carrier Engine Cooling System. The coolant is circulated by a belt-driven, ball-bearing type water pump. A suction fan pulls air through the radiator. The coolant passes from an outlet at the bottom of the radiator through the pump directly into the engine block, and is circulated through the water jacket which surrounds the cylinders and valve seats. The coolant is returned to the radiator through an outlet elbow at the top of the cylinder head. A thermostat mounted inside the thermostat housing prevents the return of the coolant to the radiator until the coolant temperature exceeds 150° F. While the thermostat is closed the coolant is returned from the cylinder head through a bypass line to the water pump, from which it is recirculated through the engine block until the thermostat opens.

b. Crane Engine Cooling System. The crane engine cooling system consists of a pressure-type radiator. Water from the radiator is led to the pump which circulates it through the engine water jacket and back into the radiator for cooling. Until the engine is up to operating temperature, all or part of the water leaving the engine jacket is bypassed directly to the pump for recirculation. Draincocks are provided for draining the cooling system, one at the bottom of the radiator and another on the front-left side of the engine block.

118. Carrier Engine Cooling System Service

Service the carrier engine cooling system as instructed in figure 71.

119. Carrier Engine Generator and Compressor Belt Adjustment

a. Generator Belt Adjustment. Adjust the carrier engine generator belt as instructed in figure 72.

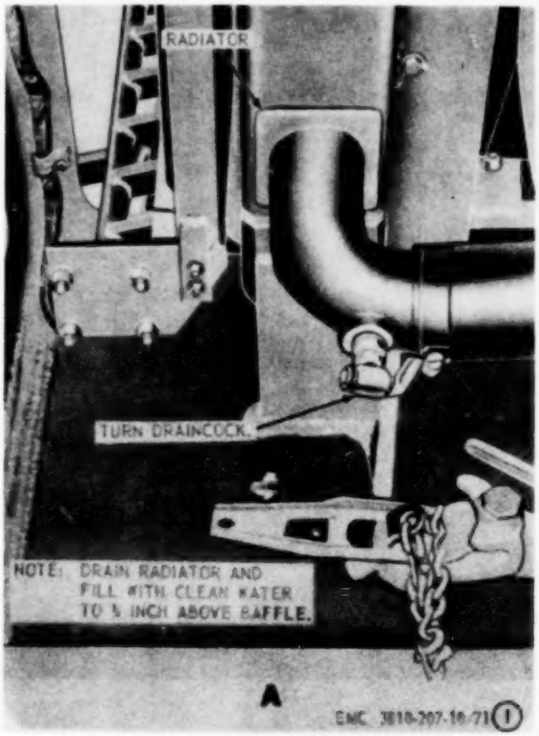
b. Compressor Belt Adjustment. Adjust the carrier engine compressor belt as instructed in figure 73.

120. Crane Engine Cooling System Service

Service the crane engine cooling system as instructed in figure 74.

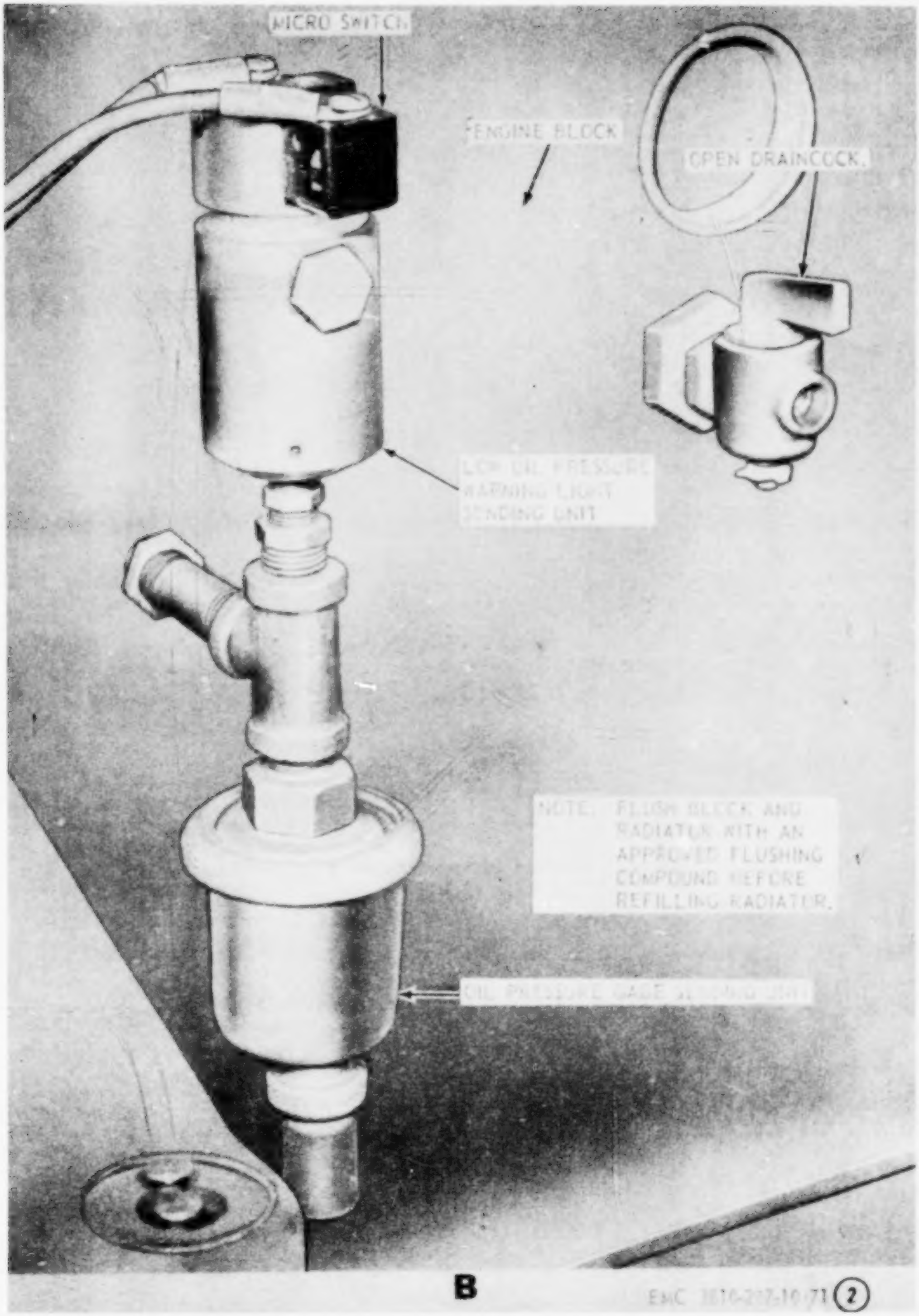
121. Crane Engine Generator Belt Adjustment

Adjust the crane engine generator belt in same manner as carrier engine generator belt (par. 119).


RADIATOR
TURN DRAINCOCK.
NOTE: DRAIN RADIATOR AND FILL WITH CLEAN WATER TO ½ INCH ABOVE BAFFLE.
A
EMC 3810-207-10/71 ①

A. Radiator service

Figure 71. Carrier engine radiator and block service.


MICRO SWITCH
ENGINE BLOCK
OPEN DRAINCOCK
LOW OIL PRESSURE WARNING LIGHT SENDING UNIT
OIL PRESSURE GAGE SENDING UNIT
B
EMC 3810-207-10/71 ②

NOTE: FLUSH BLOCK AND RADIATOR WITH AN APPROVED FLUSHING COMPOUND BEFORE REFILLING RADIATOR.

B. Block service
Figure 71—Continued.

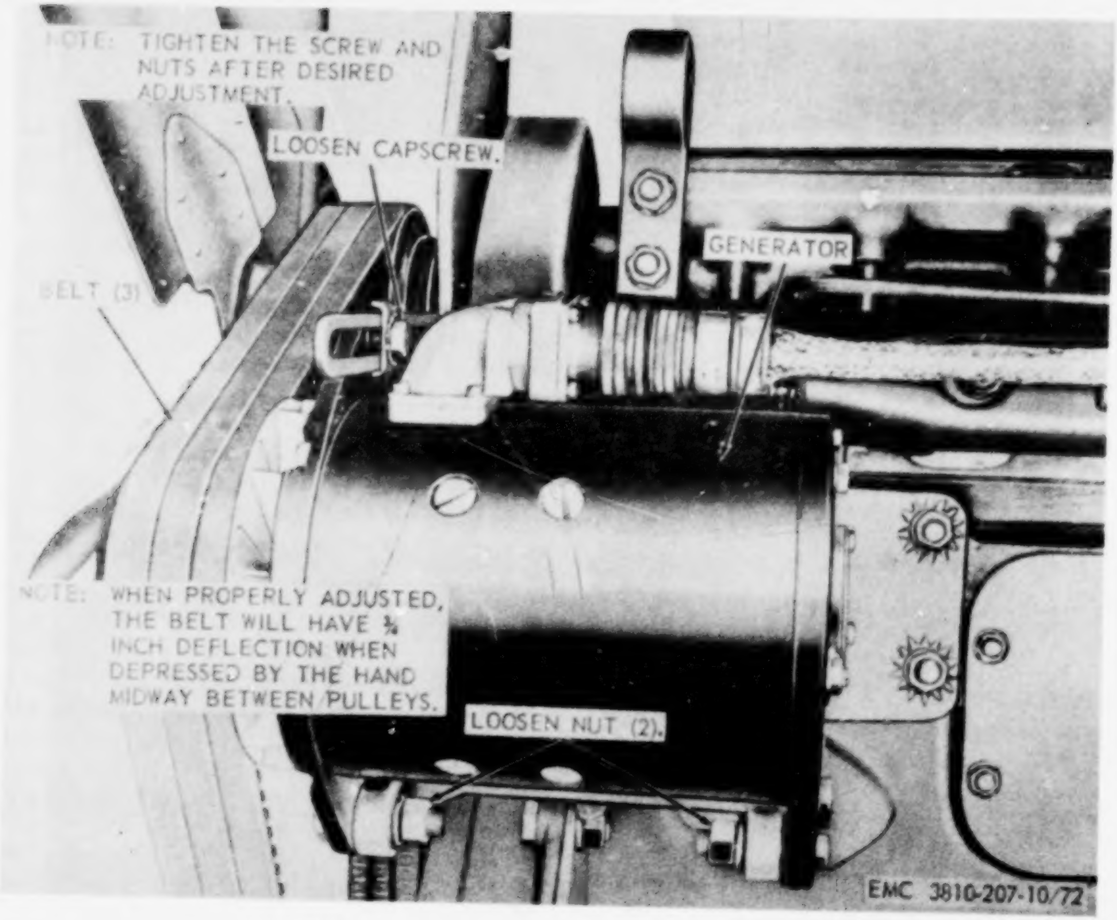

NOTE: TIGHTEN THE SCREW AND NUTS AFTER DESIRED ADJUSTMENT.
LOOSEN CAPSCREW.
GENERATOR
BELT (3)
NOTE: WHEN PROPERLY ADJUSTED, THE BELT WILL HAVE ⅜ INCH DEFLECTION WHEN DEPRESSED BY THE HAND MIDWAY BETWEEN PULLEYS.
LOOSEN NUT (2).
EMC 3810-207-10/72

Figure 72. Carrier engine generator belt adjustment.

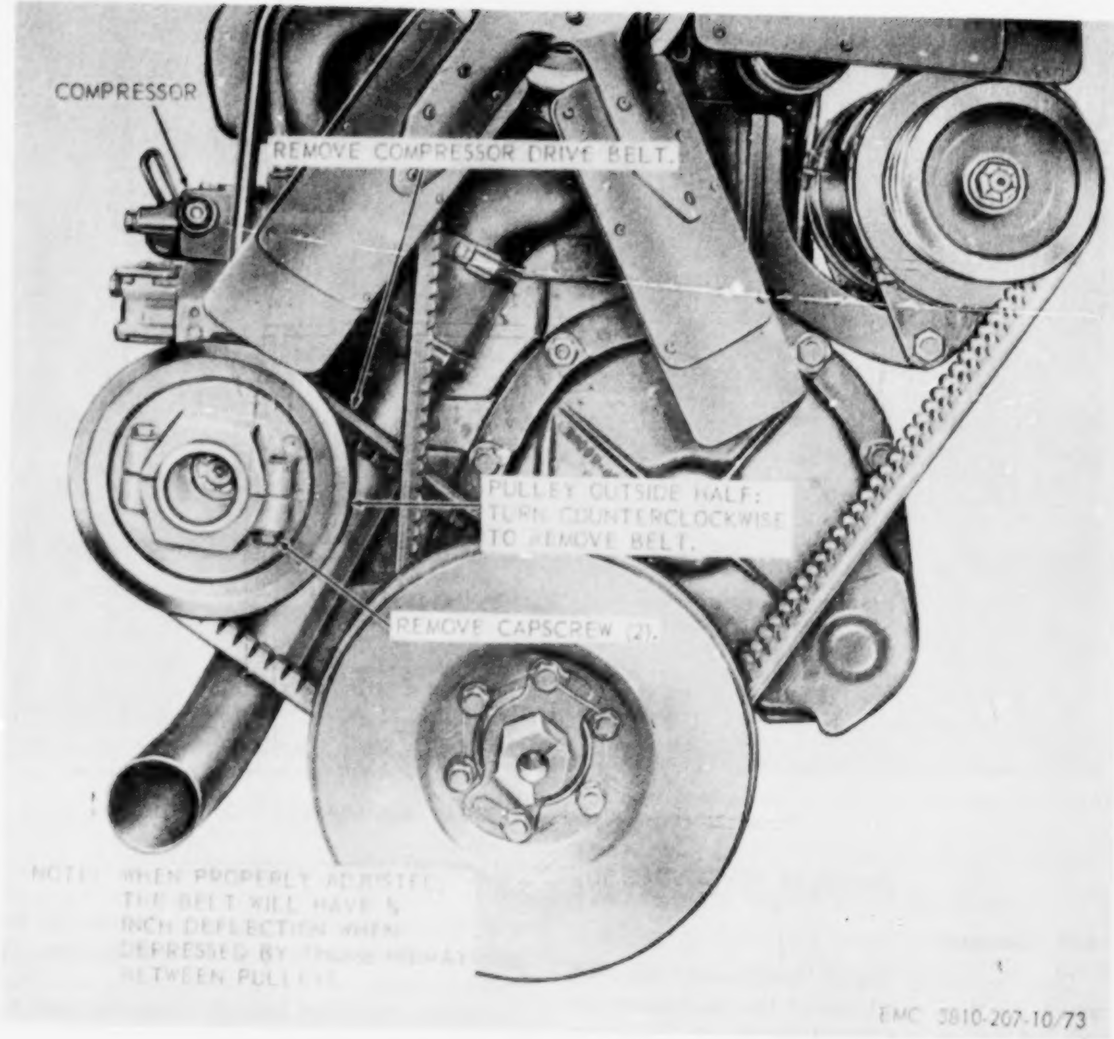

COMPRESSOR
REMOVE COMPRESSOR DRIVE BELT.
PULLEY OUTSIDE HALF: TURN COUNTERCLOCKWISE TO REMOVE BELT.
REMOVE CAPSCREW (2).
NOTE: WHEN PROPERLY ADJUSTED, THE BELT WILL HAVE ½ INCH DEFLECTION WHEN DEPRESSED BY THUMB MIDWAY BETWEEN PULLEYS.
EMC 3810-207-10/73

Figure 73. Carrier engine compressor belt adjustment.

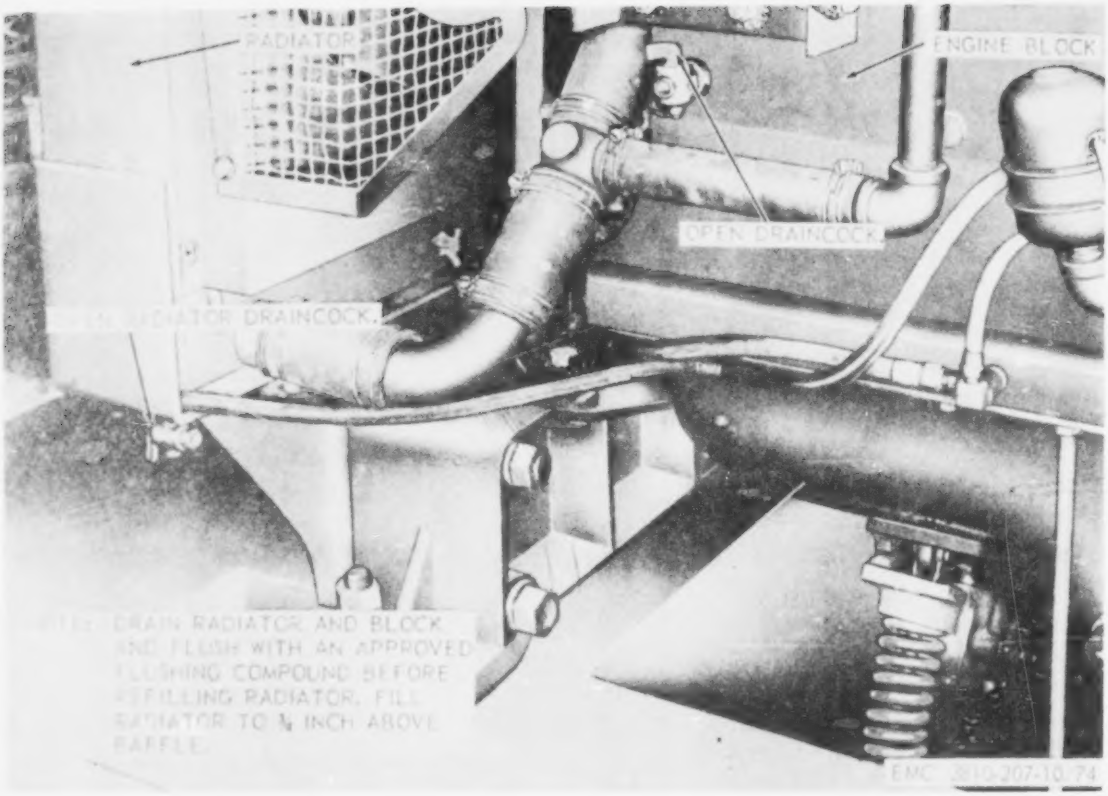

RADIATOR
ENGINE BLOCK
OPEN DRAINCOCK
OPEN RADIATOR DRAINCOCK
NOTE: DRAIN RADIATOR AND BLOCK AND FLUSH WITH AN APPROVED FLUSHING COMPOUND BEFORE REFILLING RADIATOR. FILL RADIATOR TO ¾ INCH ABOVE BAFFLE.
EMC 3810-207-10/74

Figure 74. Crane engine radiator and block service.

Section XI. REVOLVING SUPERSTRUCTURE FRAME ASSEMBLY

122. General

The revolving frame machinery, through which all the operations of the machinery are carried out, is supported by the revolving superstructure frame. There are five principle shafts which carry operating machinery: the jackshaft, boom hoist shaft, main hoist shaft, vertical swing shaft, and horizontal swing shaft. Adjustments to brakes and clutches on the horizontal swing shaft, main hoist shaft, and the boom hoist shaft are necessary to compensate for lining wear.

123. Boom Hoist Brakeband Adjustment

To adjust the boom hoist brakeband, refer to figure 75.

a. Remove the rear floor shield assembly.

b. To tighten the brakeband, loosen the rear locknut on the adjusting rod and tighten the front locknut.

c. Turn the front locknut clockwise until the desired tension of the brakeband is obtained. Tighten rear locknut.

d. To loosen brakeband, loosen front locknut and turn rear locknut; then tighten front locknut.

e. Adjust the brake return spring on the spring adjusting rod by turning the locknut clockwise or counterclockwise. There should never be less than 1/32 inch between the spring coils when brake is engaged.

f. When brake is properly adjusted, there should be 3/4-inch-clearance between the head of the adjusting screw and the brake arm. Install the rear floor shield assembly.

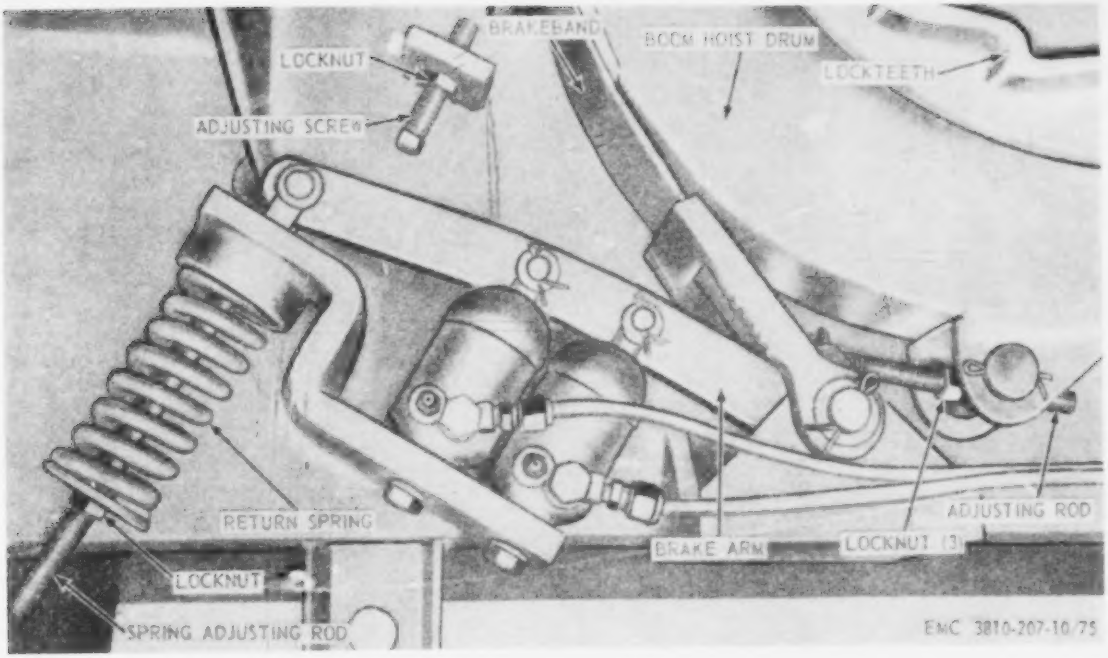


Figure 75. Boom hoist brake adjustment points.

124. Swing Brakeband Adjustment

To adjust the swing brakebands, refer to figure 76.

a. With the brake disengaged, loosen the outer nut on the brake actuating yoke.

b. Turn the inner nut on the actuating yoke clockwise to tighten brakeband and counterclockwise to loosen band.

c. When brakeband is properly adjusted, tighten the outer nut.

Caution: **Make certain the swing brakeband is not set too tight where it will drag on the drum when it is released.**

125. Power Load Lowering Brake Adjustment

a. To tighten the brakeband (fig. 77) on the primary drum clutch, remove the cotter pin and turn the nut clockwise; to loosen brakeband turn the nut counterclockwise.

b. Adjust the spring tension on the eyebolt by loosening the locknut and turning the adjusting nut clockwise to increase, and counterclockwise to decrease spring tension.

c. Tighten or loosen the locknut and adjusting nut as desired to give brakeband uniform release.

Note. The band should not drag on top of the drum.

126. Primary Hoist Brake Adjustment

Adjust the primary hoist brakeband in same manner as power load lowering brake (par. 125).

127. Secondary Hoist Brake Adjustment

Adjust the secondary hoist brakeband in same manner as power load lowering brake (par. 125).

128. Left-Hand Swing Clutch Adjustment

Adjust the left-hand swing clutch (fig. 76) on the left side of the horizontal swing shaft.

a. With the control lever (fig. 17) in the neutral position, loosen the four nuts on the equalizer screw.

b. Adjust the four equalizer screws until there is 0.015 inch clearance between the swing clutch drum and the clutch lining at each point.

c. Tighten the four locknuts.

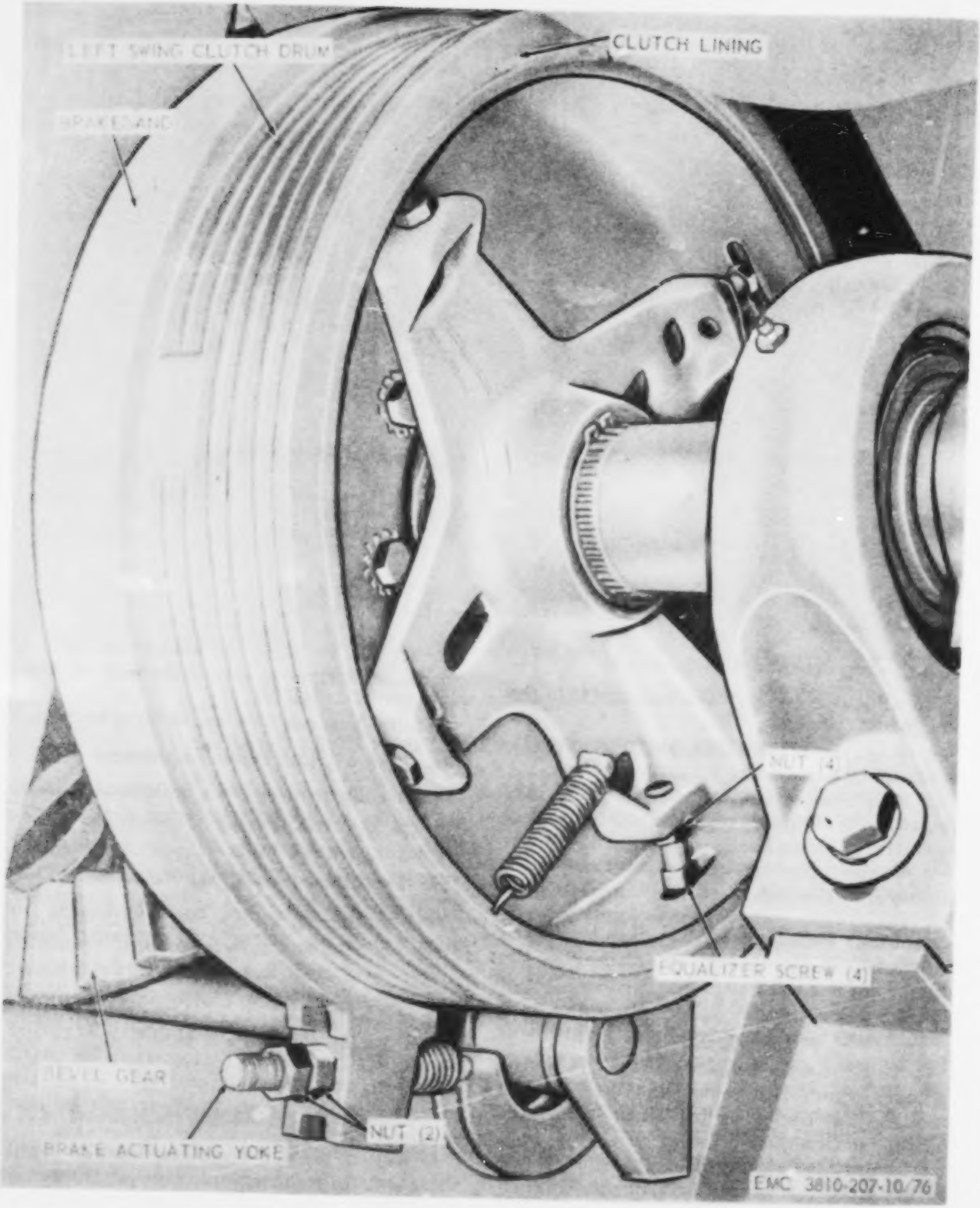


Figure 76. Swing brake and clutch adjustment points.

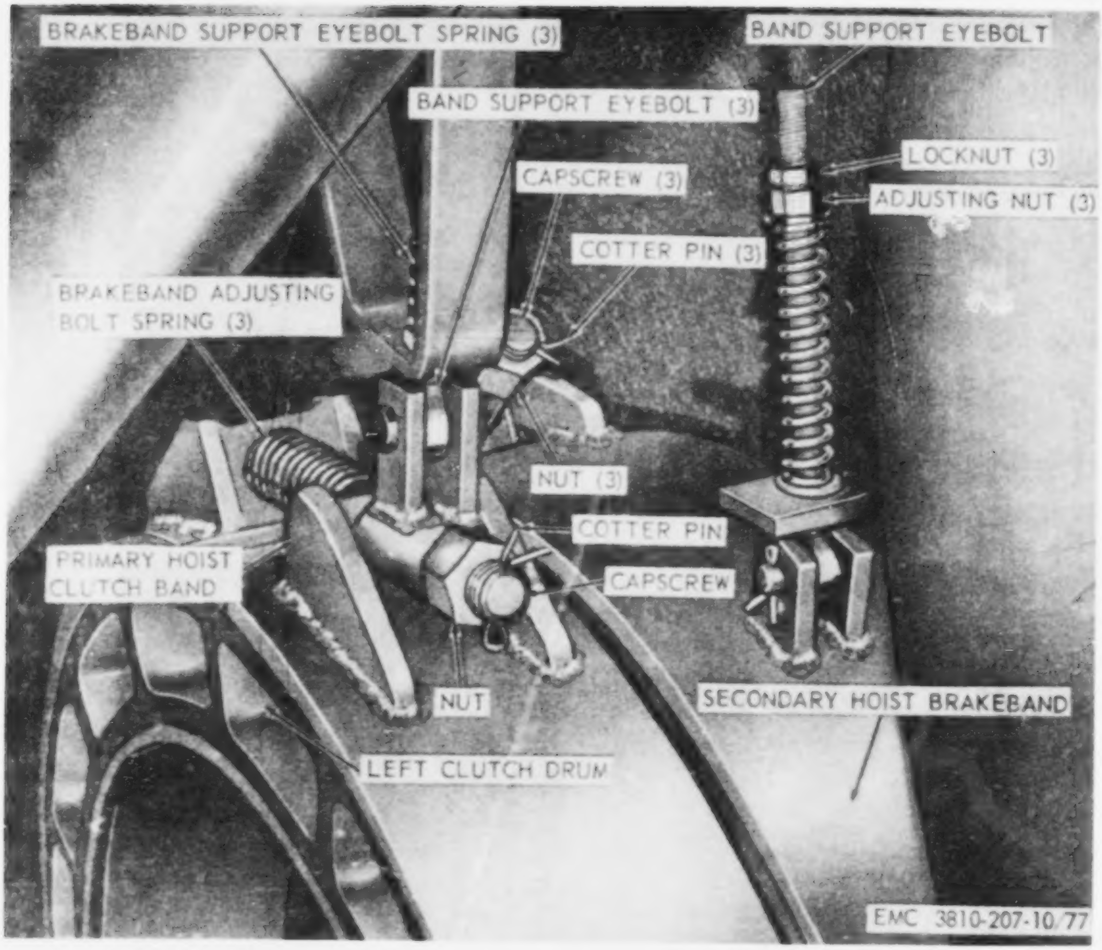


Figure 77. Power load lowering brake and primary brake adjustment points.

129. Right-Hand Swing Clutch Adjustment

Adjust the right-hand swing clutch on the right end of the horizontal swing shaft in the same manner as the left-hand swing clutch (par. 128).

130. Primary Clutch Adjustment

Adjust the primary clutch on the left end of the main hoist shaft in the same manner as the left-hand swing clutch (par. 128).

131. Secondary Clutch Adjustment

Adjust the secondary clutch on the right end of the main hoist shaft in the same manner as the left-hand swing clutch (par. 128).

132. Boom Hoist Clutch Adjustment

Adjust the boom hoist clutch on the left end of the boom hoist shaft in the same manner as the left-hand swing clutch (par. 128).

133. Crane Operator's Seat Adjustment

Make the necessary height and back adjustments on the crane operator's seat as instructed in figure 78.

134. Crane Engine Clutch Adjustment

Adjust the engine clutch as instructed in figure 79.

135. Carrier Engine Linkage Adjustment

a. Adjust the carrier engine clutch linkage as illustrated in figure 80.

b. Adjust the carrier engine clutch linkage so that there is approximately 1 1/2 inch free travel on the clutch pedal.

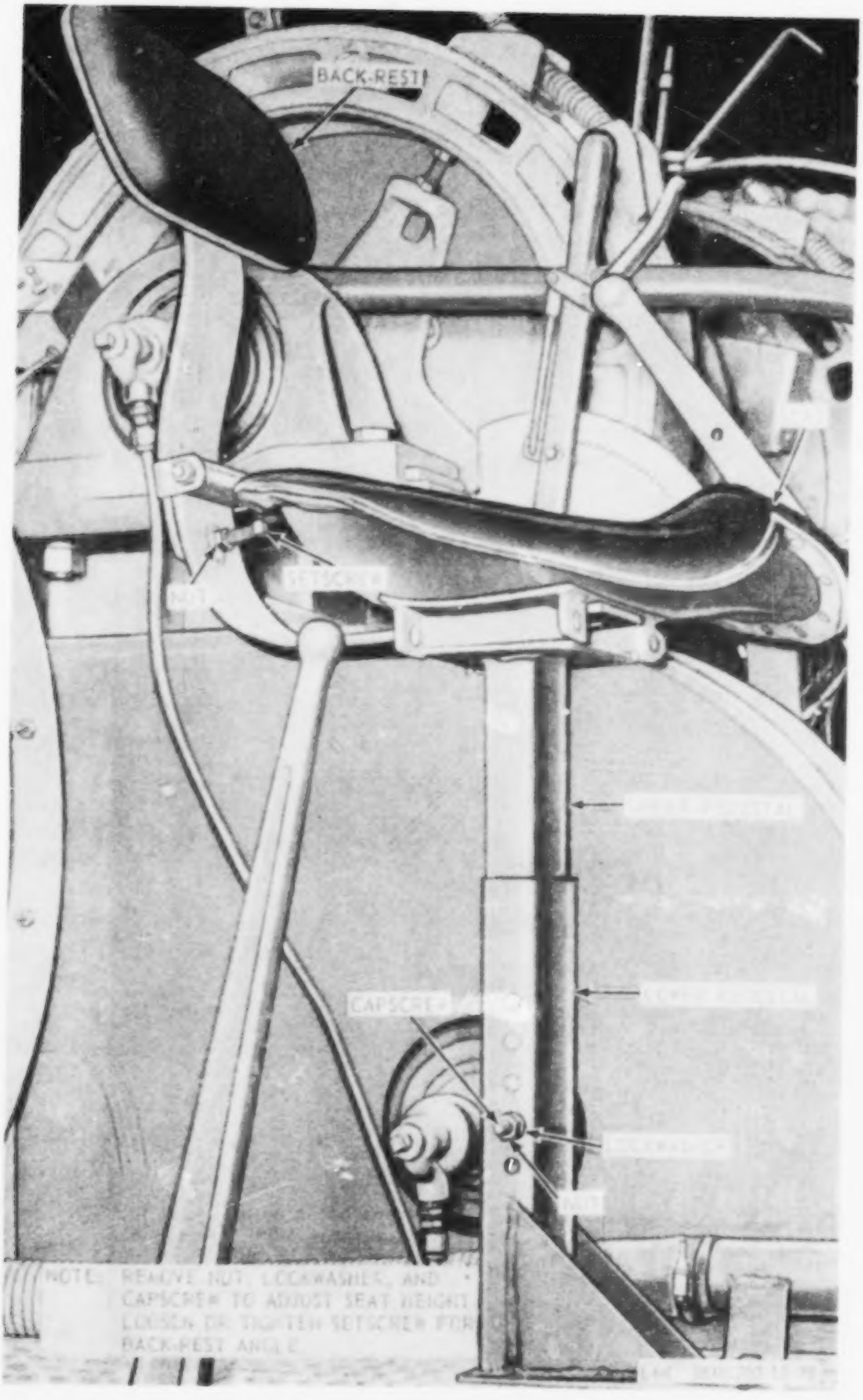
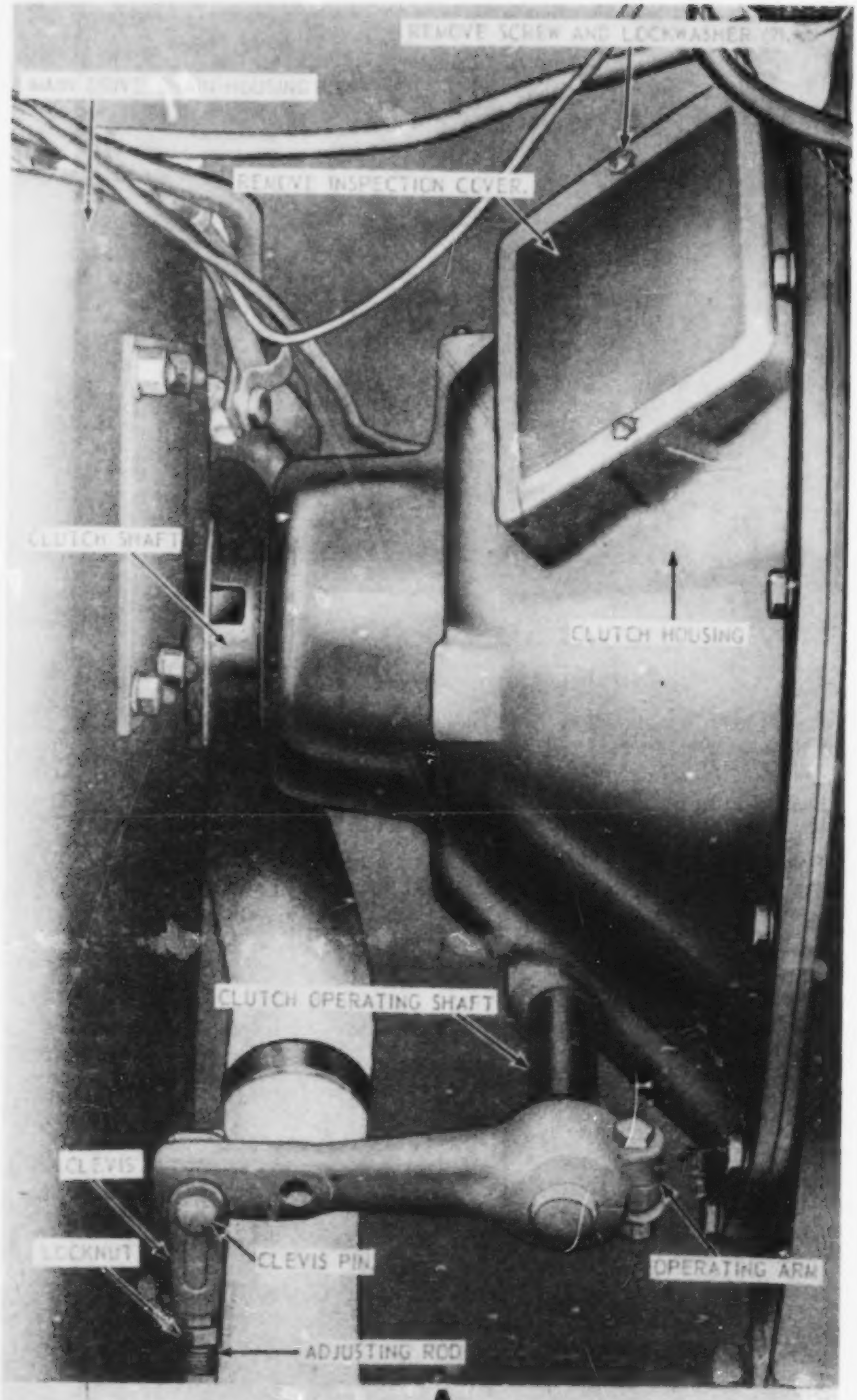
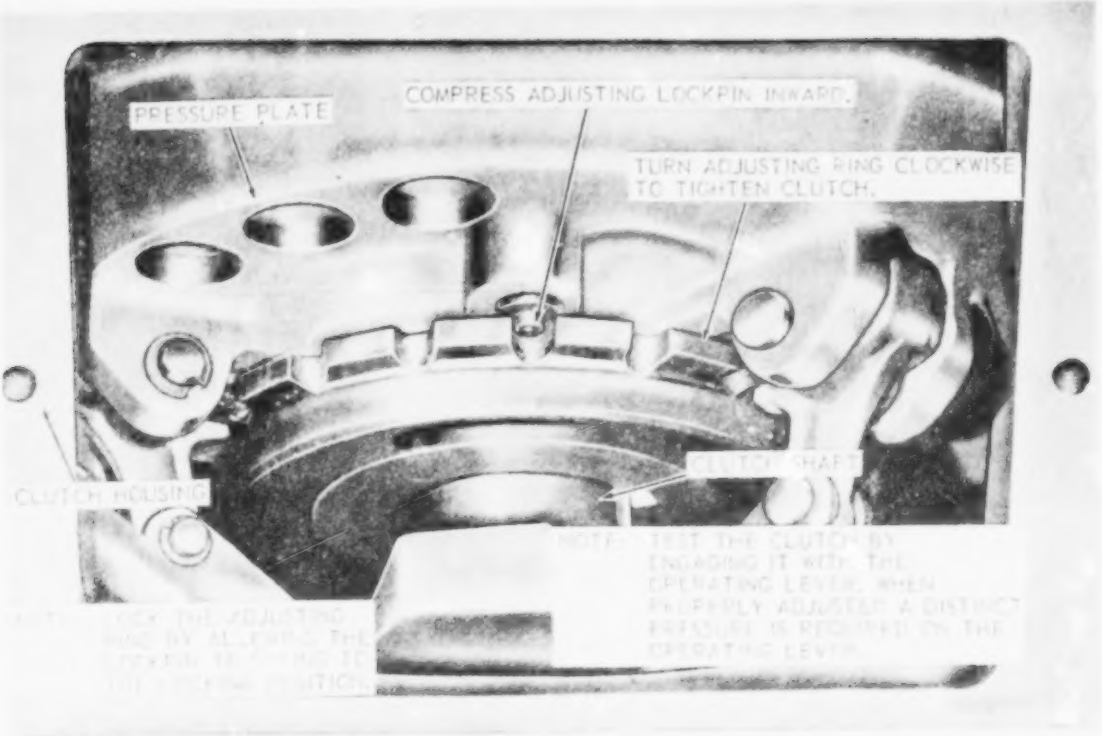

BACK-REST
NUT
SETSCREW
CAPSCREW
LOCKWASHER
NUT
NOTE: REMOVE NUT, LOCKWASHER, AND CAPSCREW TO ADJUST SEAT HEIGHT. LOOSEN OR TIGHTEN SETSCREW FOR BACK-REST ANGLE.

Figure 78. Crane operator's seat adjustment.



A. Crane engine clutch cover, removal
Figure 79. Crane engine clutch adjustment.



COMPRESS ADJUSTING LOCKPIN INWARD.

TURN ADJUSTING RING CLOCKWISE TO TIGHTEN CLUTCH.

NOTE: LOCK THE ADJUSTING RING BY ALLOWING THE LOCKPIN TO SPRING TO THE LOCKING POSITION.

NOTE: TEST THE CLUTCH BY ENGAGING IT WITH THE OPERATING LEVER. WHEN PROPERLY ADJUSTED A DISTINCT PRESSURE IS REQUIRED ON THE OPERATING LEVER.

B. Clutch adjustment

Figure 79—Continued.

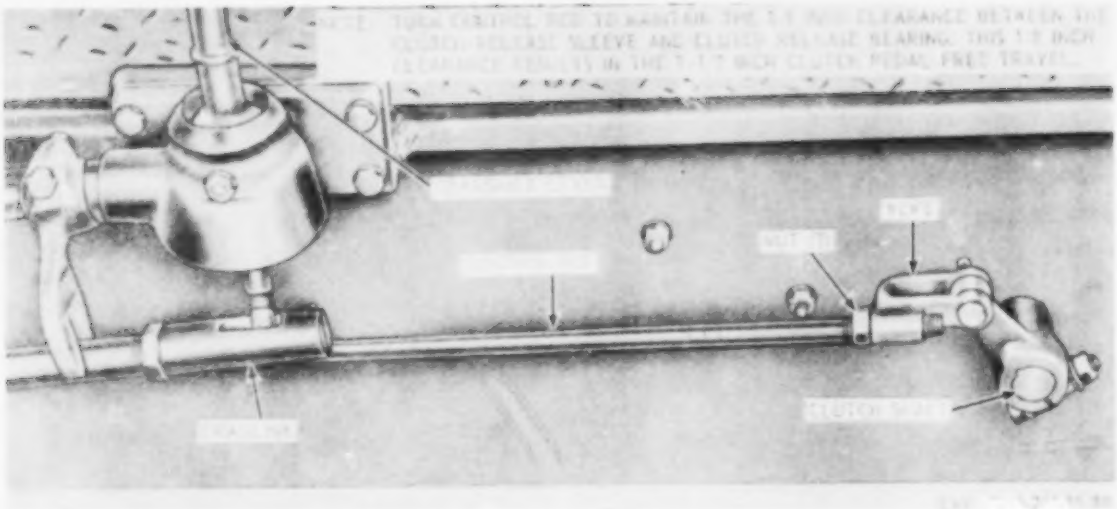

NOTE: TURN CONTROL ROD TO MAINTAIN THE 1/8 INCH CLEARANCE BETWEEN THE CLUTCH RELEASE SLEEVE AND CLUTCH RELEASE BEARING. THIS 1/8 INCH CLEARANCE RESULTS IN THE 1-1/2 INCH CLUTCH PEDAL FREE TRAVEL.
YOKE

Figure 80. Carrier engine clutch linkage adjustment.

Section XII. AUXILIARY EQUIPMENT

136. General

The crane-shovel is equipped with two heaters on the carrier and one, serving as both a personnel and engine heater, on the crane. The carrier personnel heater is thermostatically controlled. The other two heaters are controlled manually.

137. Crane Engine Heater Fuel Pump Filter Element Service

Service the crane engine heater fuel pump filter element as instructed in figure 81.

138. Crane Engine Heater Fuel Pump Screen Service

Service the crane engine heater fuel pump screen as instructed in figure 81.

139. Crane Engine Heater Assembly Fuel Filter Service

a. Removal. Remove the crane engine heater cover as instructed in figure 82.

b. Assembly Fuel Filter Service. Service the assembly fuel filter as instructed in figure 83.

c. Installation. Install the crane engine heater cover as illustrated in figure 82.

140. Carrier Engine Heater Fuel Pump Filter Service

Service the carrier engine heater fuel pump filter in the same manner as instructed for engine heater fuel pump filter service (par. 137).

141. Carrier Engine Heater Fuel Pump Screen Service

Service the carrier engine heater fuel pump screen in the same manner as instructed for the crane engine heater fuel pump screen (par. 138).

142. Carrier Engine Heater Assembly Fuel Filter Service

Service the carrier engine heater assembly fuel filter in the same manner as instructed for the crane engine heater assembly fuel filter (par. 139).

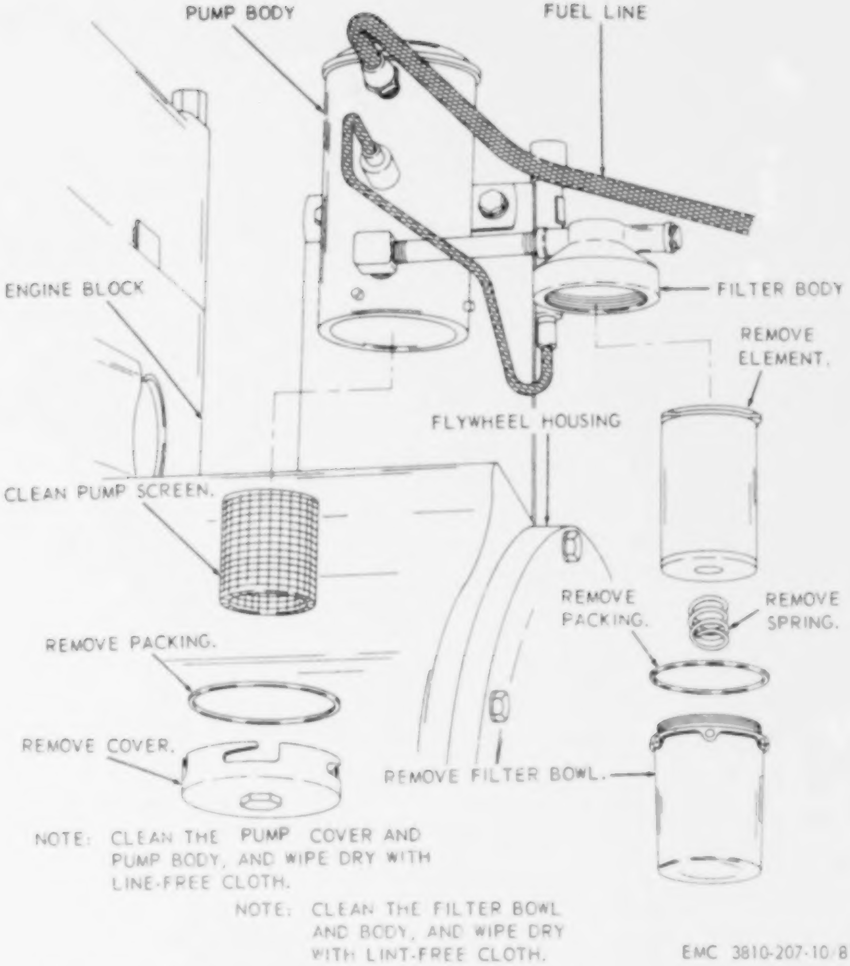


Figure 81. Crane engine heater fuel pump screen and fuel pump filter service.

143. Dipper Teeth

a. Shovel Bucket Teeth Removal and Installation.

(1) Remove the shovel bucket teeth as instructed in figure 84.

(2) Install the shovel bucket teeth as illustrated in figure 84.

b. Back Hoe, Clamshell, and Dragline Bucket Teeth Removal and Installation. Remove and install the back hoe, clamshell, and dragline bucket teeth in a similar manner as for shovel bucket teeth (fig. 84).

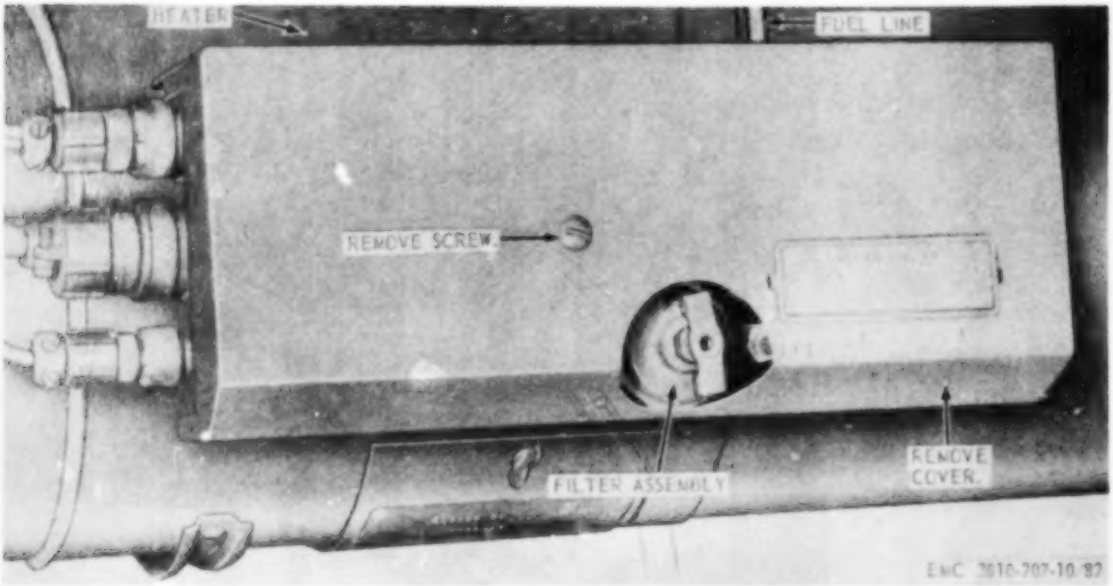


Figure 82. Crane engine heater cover, installed view.

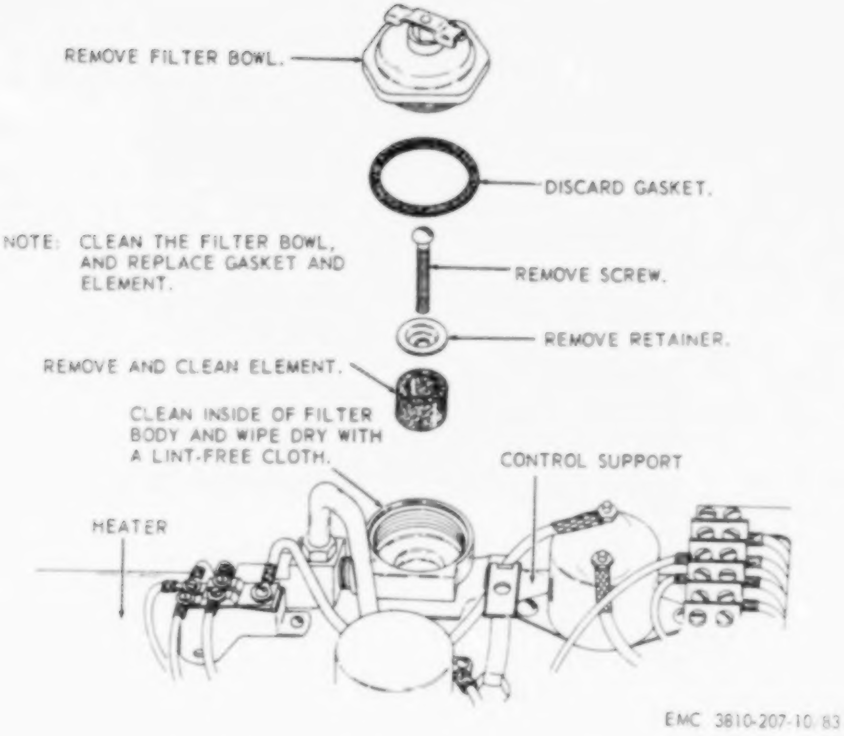

REMOVE FILTER BOWL.
DISCARD GASKET.
NOTE: CLEAN THE FILTER BOWL, AND REPLACE GASKET AND ELEMENT.
REMOVE SCREW.
REMOVE RETAINER.
REMOVE AND CLEAN ELEMENT.
CLEAN INSIDE OF FILTER BODY AND WIPE DRY WITH A LINT-FREE CLOTH.
CONTROL SUPPORT
HEATER
EMC 3810-207-10/83

Figure 83. Crane engine heater assembly fuel filter service.

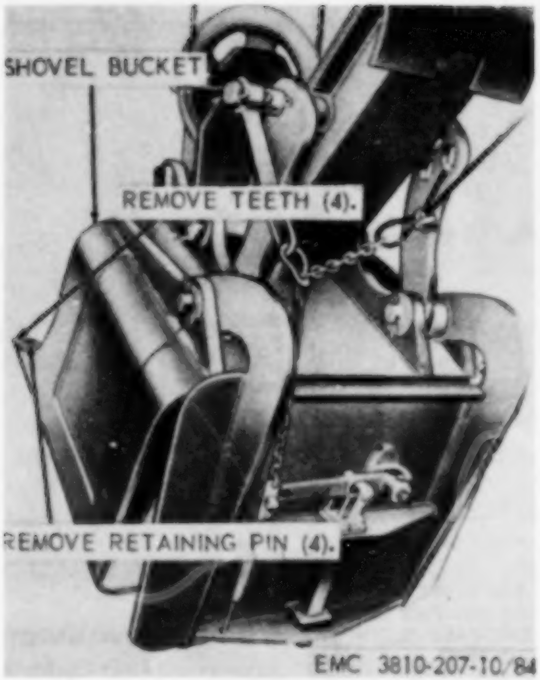


Figure 84. Shovel bucket teeth, removal and installation.

CHAPTER 4

DEMOLITION OF MATERIEL TO PREVENT ENEMY USE

144. General

When capture or abandonment of the crane-shovel to an enemy is imminent, the responsible unit commander must make the decision either to destroy the equipment or to render it inoperative. Based on this decision, orders are issued which cover the desired extent of destruction. Whatever method of demolition is employed, it is essential to destroy the same vital parts of all crane-shovels and all corresponding repair parts.

145. Demolition to Render the Equipment Inoperative

a. Demolition by Mechanical Means. Use sledge hammers, crowbars, picks, axes, or any other heavy tools which may be available to destroy the following:

(1) Engine block and manifold.

(2) Carburetor, magneto, governor, and water pump.

(3) Radiator, starter, motor, and generator.

Note. The above steps are minimum requirements for this method.

(4) Cables, drum brakes, clutches, control levers, and rollers.

(5) Carrier transmission, transfer case, and differentials.

b. Demolition by Misuse. Perform the following steps to render the engine inoperative.

(1) Drain the engine radiators and crankcases.

(2) Throw sand and other abrasive material into the engine clutches, main drive chain cases, jack shafts, bevel gears, horizontal gear trains, hydraulic steering reservoirs, and all other accessible gearcases.

Note. The above steps are minimum requirements for this method.

(3) Start both engines and engage the crane master clutch.

(4) Operate the unit until failure occurs.

146. Demolition by Explosives or Weapons Fire

a. Explosives. Place as many of the following charges (fig. 85) as the situation permits and detonate them simultaneously with a detonating cord and a suitable detonator.

(1) *Revolving frame machinery.*

(*a*) One 1/2-pound charge on each swing clutch.

(*b*) Two 1/2-pound charges on the boom hoist clutch.

(*c*) One 1/2-pound charge on each drum clutch.

(*d*) Two 1/2-pound charges on the engine block.

(2) *Carrier.*

(*a*) One 1/2-pound charge on front differential.

(*b*) One 1/2-pound charge on engine block.

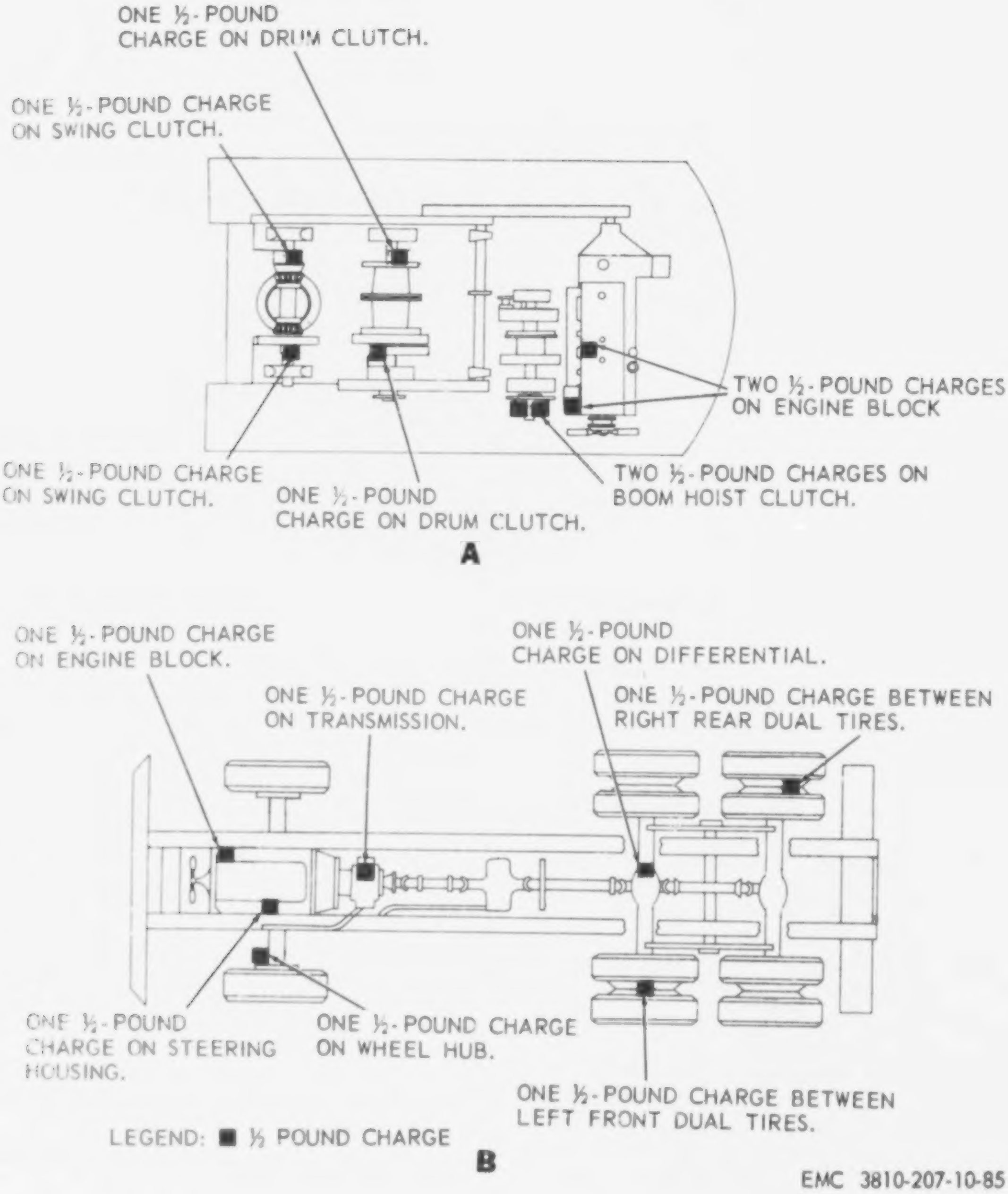
(*c*) One 1/2-pound charge on transmission.

(*d*) One 1/2-pound charge between the right rear and left front of dual tires.

(*e*) One 1/2-pound charge on left front wheel hub.

(*f*) One 1/2-pound charge on steering gear housing.

b. Weapons Fire. Fire on the crane, carrier, and attachments with the heaviest practical weapons available. If possible, aim for the engine block from either side.


ONE ½-POUND CHARGE ON DRUM CLUTCH.
ONE ½-POUND CHARGE ON SWING CLUTCH.
TWO ½-POUND CHARGES ON ENGINE BLOCK
ONE ½-POUND CHARGE ON SWING CLUTCH.
ONE ½-POUND CHARGE ON DRUM CLUTCH.
TWO ½-POUND CHARGES ON BOOM HOIST CLUTCH.
A
ONE ½-POUND CHARGE ON ENGINE BLOCK.
ONE ½-POUND CHARGE ON DIFFERENTIAL.
ONE ½-POUND CHARGE ON TRANSMISSION.
ONE ½-POUND CHARGE BETWEEN RIGHT REAR DUAL TIRES.
ONE ½-POUND CHARGE ON STEERING HOUSING.
ONE ½-POUND CHARGE ON WHEEL HUB.
ONE ½-POUND CHARGE BETWEEN LEFT FRONT DUAL TIRES.
LEGEND: ■ ½ POUND CHARGE
B
EMC 3810-207-10-85

A. Placement of charges on revolving frame

B. Placement of charges on carrier

Figure 85. Placement of charges.

147. Other Demolition Methods

a. Scattering and Concealment. Remove all easily accessible vital parts such as batteries, oil filters, generator, generator regulator, magneto, starter, carburetors, and filters. Scatter them throughout the underbrush or dense foliage, bury them in dirt or sand, or throw them in a lake, stream, well, or other body of water.

b. Burning. Pack rags, clothing, canvas, or brush inside and around the crane unit. Saturate this packing with gasoline, oil, or diesel fuel and ignite.

c. Submersion. Totally submerge the crane and carrier in a deep body of water to provide water damage and concealment. Salt water will cause greater damage to metal parts than fresh water.

148. Training

All operators should receive thorough training in the destruction of the crane-shovel, carrier, and attachments. Refer to FM 5–25. Simulated destruction, using all of the methods listed above, should be included in the operator training program. It must be emphasized in training, that demolition operations are usually necessitated by critical situations when time available for destruction is limited. For this reason, it is necessary that operators be thoroughly familiar with all methods of destruction of equipment and be able to carry out demolition instructions without reference to this or any other manual.

APPENDIX I.
REFERENCES

1. Dictionaries of Terms and Abbreviations

AR 320–5	Dictionary of United States Army Terms.
AR 320–50	Authorized Abbreviations and Brevity Codes.

2. Fire Protection

TM 5–687	Repair and Utilities: Fire Protection Equipment and Appliances; Inspections, Operations, and Preventive Maintenance.
TM 9–1799	Ordnance Maintenance: Fire Extinguishers.

3. Lubrication

LO 5–3810–207–20	Lubrication Order.

4. Preventive Maintenance

AR 750–5	Maintenance of Supplies and Equipment.
TB ENG–347	Winterization Techniques for Engineer Equipment.
TM 38–750	Army Equipment Records System and Procedures.

5. Publications Indexes

DA Pam 310–3	Index of Training Publications
DA Pam 310–4	Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders.
DA Pam 310–25	Index of Supply Manuals—Corps of Engineers.

6. Supply Publications

SB 38–5–3	List of Standard Reference Fuels, Solvents and Preservative Material for Which QMC Is Assigned Logistics Responsibility.
SM 10–1–C4–1	Petroleum, Petroleum-Base Products, and Related Material.

7. Training Aids

FM 5–25	Explosives and Demolitions.
FM 5–35	Engineers' Reference and Logistical Data.
FM 21–5	Military Training.
FM 21–6	Techniques of Military Instruction.
FM 21–30	Military Symbols.

APPENDIX II

BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

1. General

This appendix lists the accessories, tools, and publications required in 1st echelon maintenance and operation, initially issued with, or autohrized for, the Quickway Crane-shovel.

2. Explanation of Columns

a. Source Codes. The information provided in each column is as follows:

(1) *Technical service.* This column lists the basic number (or symbol) of the technical service assigned supply responsibility for the part. Those spaces left blank denote Corps of Engineers supply responsibility. General Engineer supply parts are identified by the letters GE in parentheses, following the nomenclature in the description column. Other technical services basic numbers (or symbols) are:

9—Ordnance Corps.
10—Quartermaster Corps
12—Adjutant General's Corps
55—Transportation Corps.

(2) *Source.* The selection status and source of supply for each part are indicated by one of the following code symbols:

(*a*) P—applied to high-mortality repair parts which are stocked in or supplied from the technical service depot system, and authorized for use at indicated maintenance echelons.

(*b*) A—applied to assemblies which are not procured or stocked as such but made up of two or more units, each of which carry individual stock numbers and descriptions and are procured and stocked and can be assembled by units at indicated maintenance echelons.

(*c*) X2—applied to repair parts which are not stocked. The indicated maintenance echelon requiring such repair parts will attempt to obtain them through cannibalization; if not obtainable through cannibalization, such repair parts will be requisitioned with supporting justification through normal supply channel.

(3) *Maintenance.* The lowest maintenance echelon authorized to use, stock, install, or manufacture the part is indicated by the following code symbol:

O—Organizational Maintenance
(1st and 2d echelon)

b. Federal Stock Numbers. When a Federal stock number is available for a part, it will be shown in this column, and used for requisitioning purposes.

c. Description.

(1) The item name and a brief description of the part are shown.

(2) A five-digit Federal supply code for manufacturers and/or other technical services is shown in parentheses followed by the manufacturer's part number. This number will be used for requisitioning purposes when no Federal stock number is indicated in the Federal stock number column.

Example: (77520) 37836.

(3) The letters GE, shown in parentheses immediately following the description, indicate general engineer supply responsibility for the part.

d. Unit of Issue. Where no abbreviation is shown in this column, the unit of issue is "each".

e. Expendability. Those items classified as nonexpendable are indicated by letters NX. Items not indicated by NX are expendable.

f. Quantity Authorized. This column lists the quantities or repair parts, accessories, tools, or publications authorized for issue to the equipment operator or crew as required.

g. Quantity Issued With Equipment. This column lists the quantities of repair parts, accessories, tools, or publications that are initially issued with each item of equipment. Those indicated by an asterisk are to be requisitioned through normal supply channels as required.

h. Illustrations. This column is subdivided into two columns which provide the following information:

(1) *Figure number.* Provides the identifying number of the illustration.

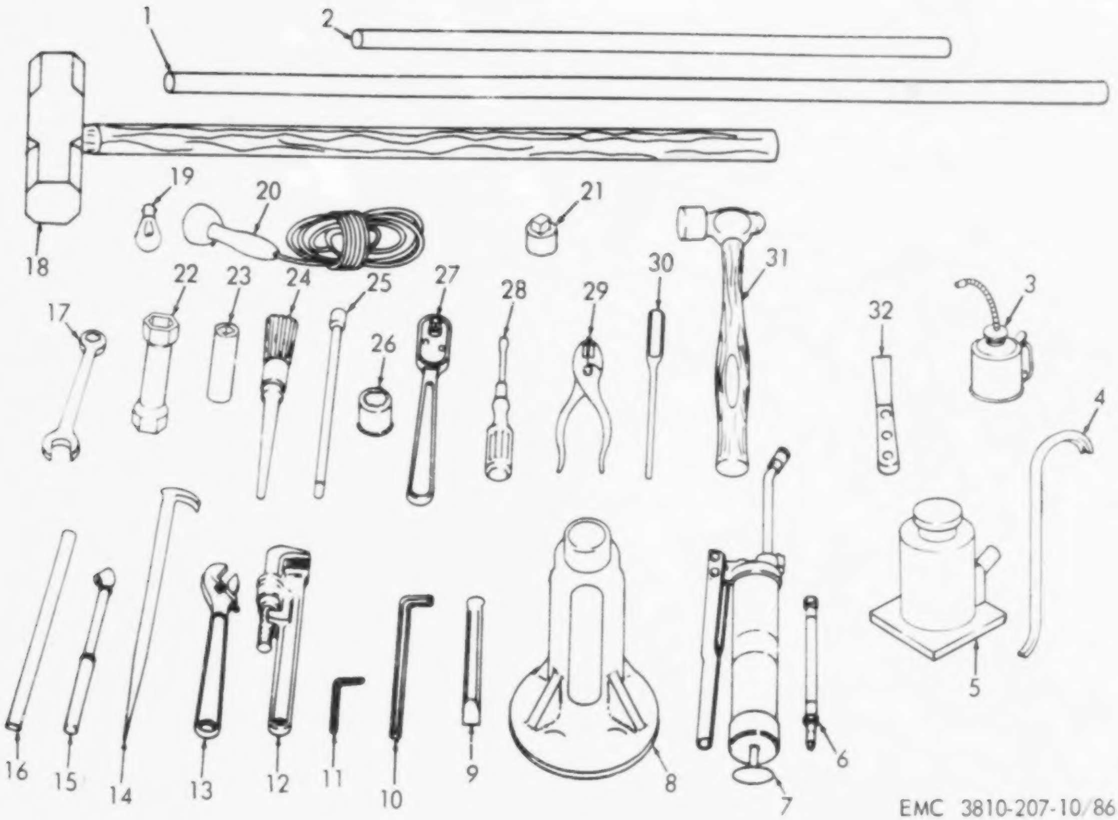
(2) *Item number.* Provides the referenced number for the part shown in the illustration.

3. Index to Federal Supply Code for Manufacturers

77520—Quick Way Truck Shovel Co.
89922—McCaffrey Rudduck Tagline Corp.

4. Comments and Suggestions

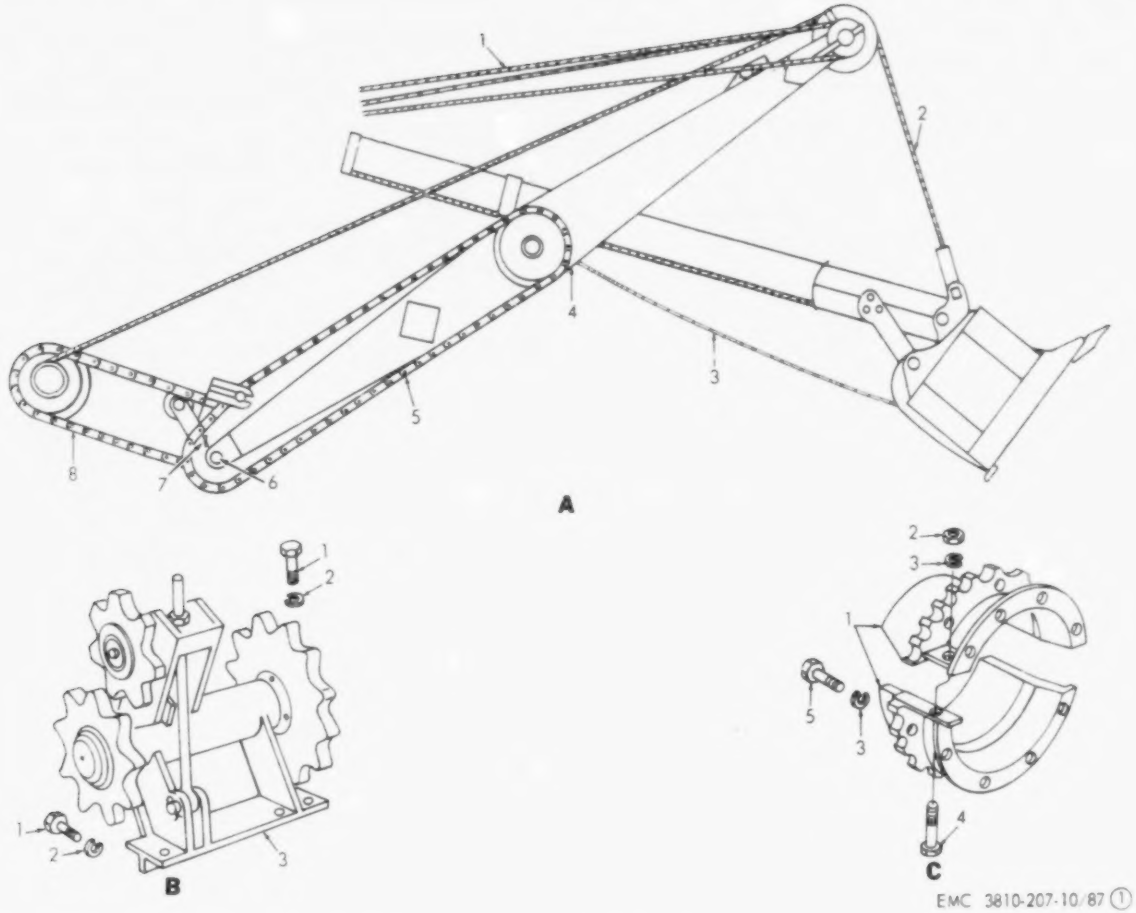
Suggestions and recommendations for changes to the Basic Issue Items List will be submitted on DA Form 2028 to the Commanding Officer, U. S. Army Engineer Maintenance Center, Corps of Engineers, ATTN: EMCDM-S, P. O. Box 119, Columbus 16, Ohio. Direct communication is authorized.



EMC 3810-207-10/86

1	Rod
2	Handle
3	Hand oiler
4	Wrecking bar
5	Jack, 20 ton
6	Hose assembly
7	Grease gun
8	Wire rope cutter
9	Chisel
10	Drain plug wrench
11	Socket head wrench
12	Pipe wrench
13	Wrench
14	Pry bar
15	Gage
16	Steel drift
17	Wrench
18	Hammer (sledge)
19	Lamp
20	Extension light
21	Adapter
22	Wrench
23	Socket
24	Paint brush
25	Extension
26	Socket
27	Handle
28	Screwdriver
29	Pliers
30	Punch
31	Hammer
32	Putty knife

Figure 86. Basic issue items.



1 Wire rope, 9/16 in., 6 x 19 (198 ft rqr)
2 Wire rope, 5/16 in., 6 x 37 (13 ft 2 in rqr)
3 Wire rope, 5/16 in., 6 x 37 (14 ft 7 in. rqr)
4 Shovel front
5 Roller chain
6 Pin, boom foot (2 rqr)
7 Pin, cotter (2 rqr)
8 Roller chain

A. Shovel

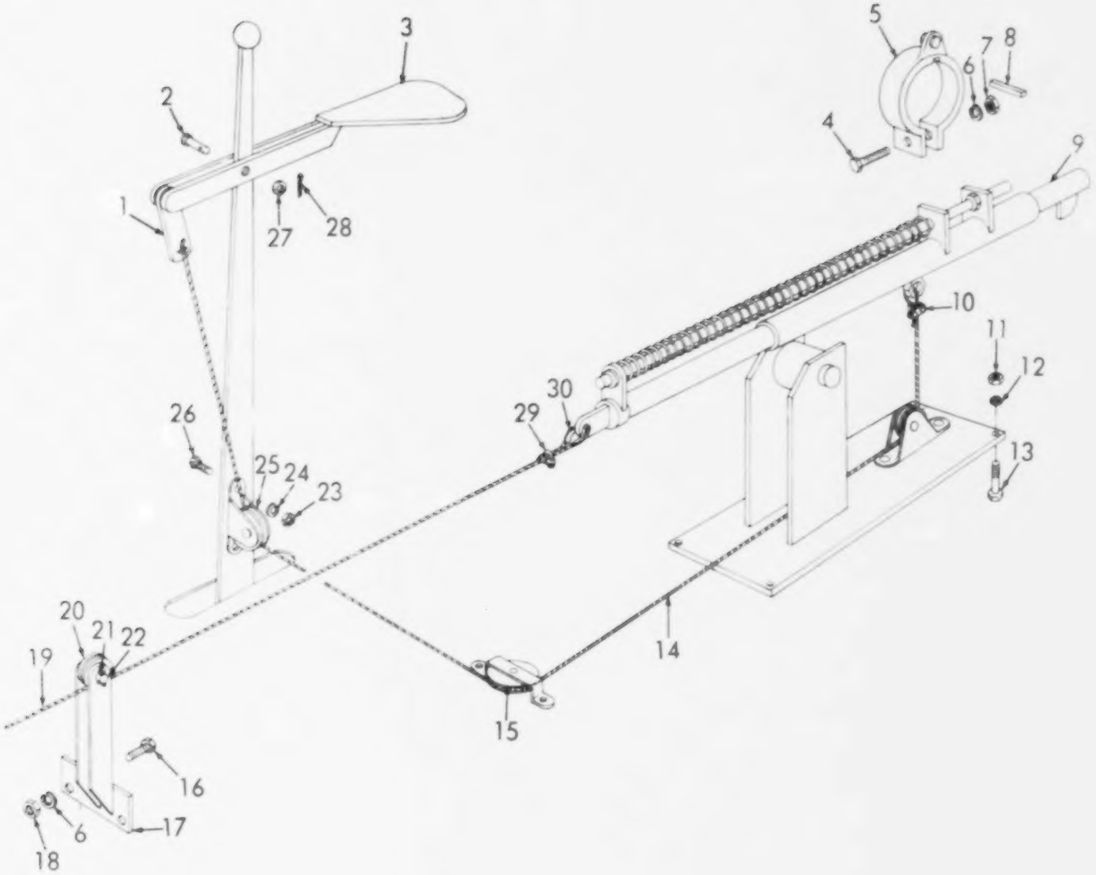
1 Screw, cap, 3/4–16 x 1 1/2 in. (8 rqr)
2 Washer, lock, 3/4 in. (8 rqr)
3 Chain tightener

B. Chain tightener

1 Drum sprocket
2 Nut, 5/8–18 (2 rqr)
3 Washer, lock, 5/8 in. (12 rqr)
4 Screw, cap, 5/8–18 x 1 3/4 in. (2 rqr)
5 Screw, cap, 5/8–18 x 1 in. (8 rqr)

C. Drum sprocket

Figure 87. Basic issue items.



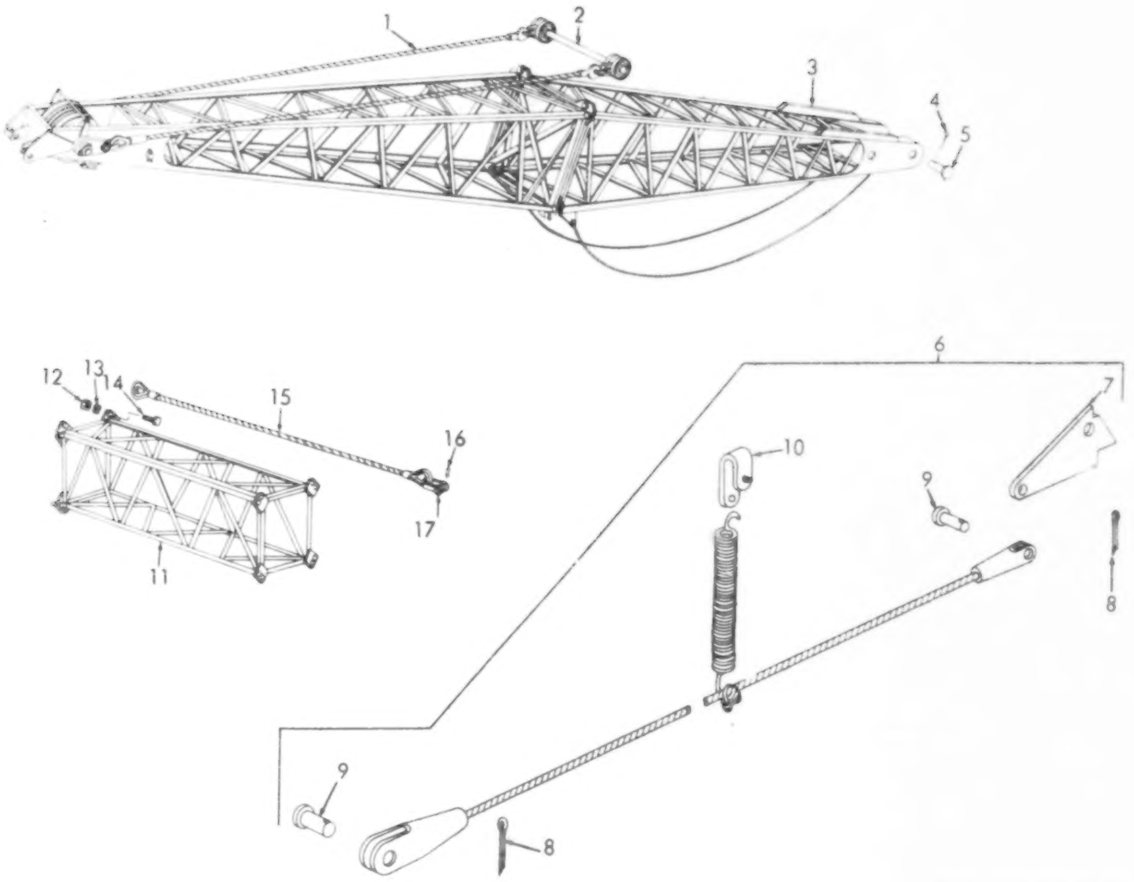
D

EMC 3810-207-10/87 ②

1	Link
2	Pin, straight, 3/8 in. x 1 3/32 (2 rqr)
3	Dipper trip lever
4	Screw, cap, 1/2–20 x 2 1/4 in.
5	Cam
6	Washer, lock, 1/2 in. (3 rqr)
7	Nut, 1/2–20
8	Key, machine
9	Trip assembly
10	Clip, wire rope, 1/8 in. (2 rqr)
11	Nut, 3/8–24 (4 rqr)
12	Washer, lock, 3/8 in. (4 rqr)
13	Screw, cap, 3/8–24 x 1 in. (4 rqr)
14	Wire rope, 1/8 in., 7 x 19, (9 ft rqr)
15	Control cable pulley
16	Screw, cap, 1/2–13 x 1 1/2 in. [illegible] rqr)
17	Guide pulley bracket
18	Nut, 1/2–13 (2 rqr)
19	Wire rope, 5/16 in. 6 x 37 (13 ft 2 in. rqr)
20	Guide pulley
21	Pin, cotter, 7/64 x 1 in. (2 rqr)
22	Pin, guide pulley
23	Nut, 1/4–28 (4 rqr)
24	Washer, lock, 1/4 in. (4 rqr)
25	Trip cable lever pulley
26	Screw, cap, 1/4–28 x 1 1/4 in. (4 rqr)
27	Washer, flat, 3/8 in. (2 rqr)
28	Pin, cotter, 3/32 x 3/4 in. (2 rqr)
29	Clip, wire rope, 5/16 in. (4 rqr)
30	Thimble, rope 5/16 in. (2 rqr)

D. Dipper trip lever assembly

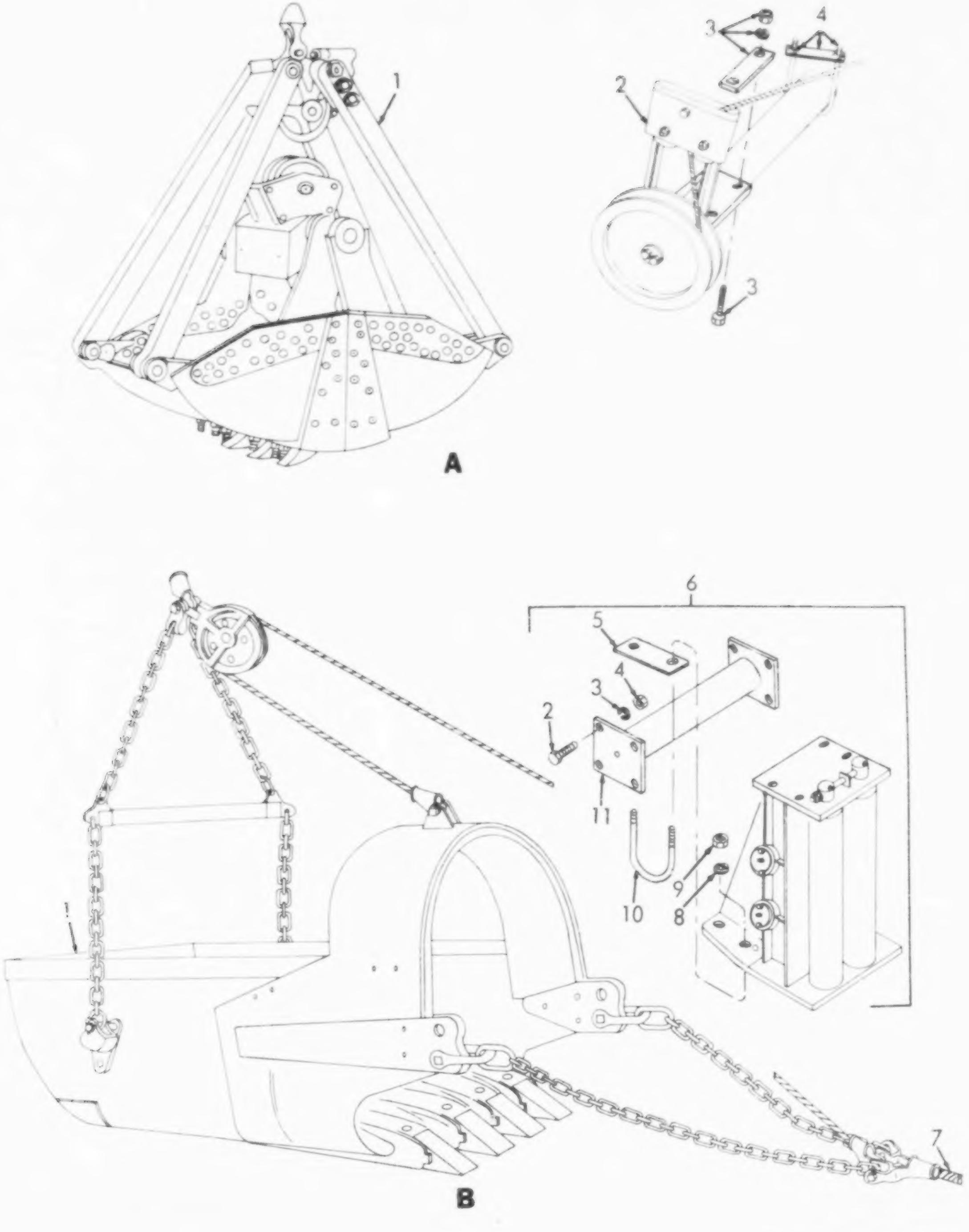
Figure 87—Continued.



EMC 3810-207-10/88

1	Pendant, wire rope, 15 ft (2 rqr)
2	Spreader assembly
3	Crane boom, 30 ft
4	Pin, cotter (2 rqr)
5	Pin, boom foot (2 rqr)
6	Stop assembly
7	Anchor, lower (2 rqr)
8	Pin, cotter (4 rqr)
9	Cable anchor pin (4 rqr)
10	Boom stop clamp (2 rqr)
11	Crane boom extension
12	Nut, 3/4-10 (8 rqr)
13	Washer, lock, 3/4 in. (8 rqr)
14	Screw, cap, 3/4-10 x 2 1/2 in. (8 rqr)
15	Pendant, wire rope, 10 ft (2 rqr)
16	Pin, cotter, 3/8 x 3 in. (6 rqr)
17	Straight pin (4 rqr)

Figure 88. Basic issue items.



EMC 3810-207-10/89

Figure 89. Basic issue items.

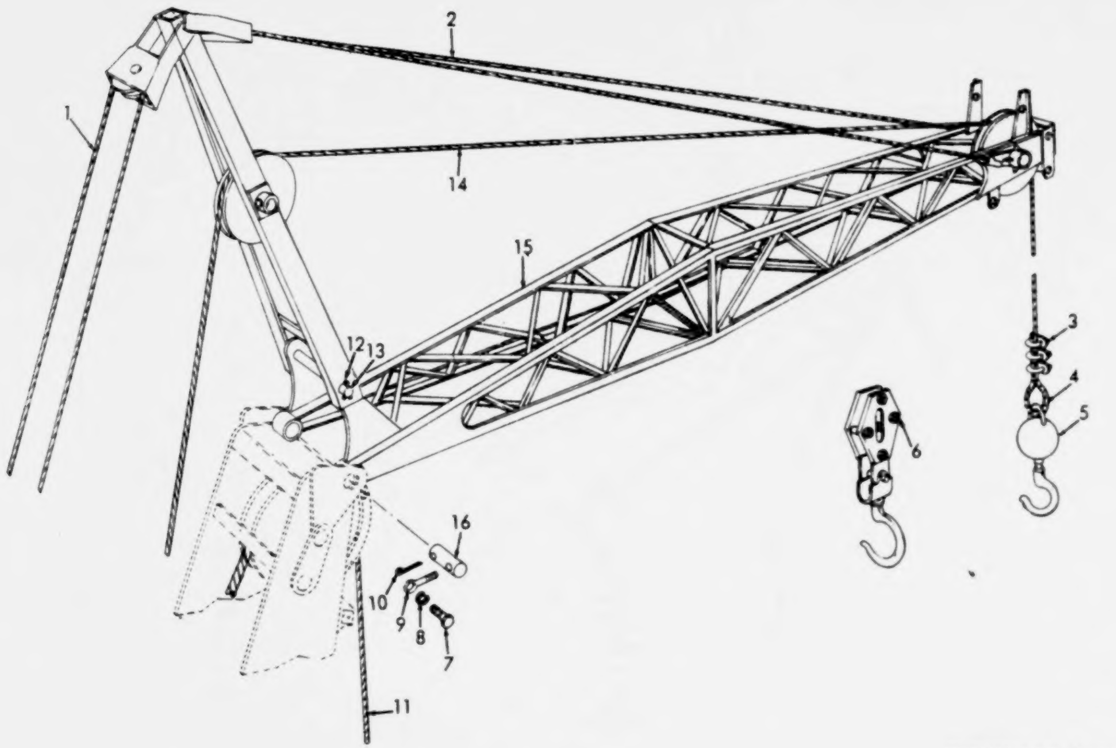
1 Clamshell bucket, 3/4 cu yd
2 Tag line
3 Clamping plate (2 rqr)
4 U-bolt

A. Clamshell bucket

1 Dragline bucket, 3/4 cu yd
2 Screw, cap, 3/4–10 x 2 in., (8 rqr)
3 Washer, lock, 3/4 in., (8 rqr)
4 Nut, 3/4–10 (8 rqr)
5 Shim, 1/16 in. thk (as rqr)
6 Fair-lead assembly
7 Wire rope, 5/8 in., 6 x 19 (75 ft rqr)
8 Washer, lock, 1 in. (8 rqr)
9 Nut, 1–8 (8 rqr)
10 U-bolt, 1–8 (4 rqr)
11 Lower tube

B. Dragline bucket

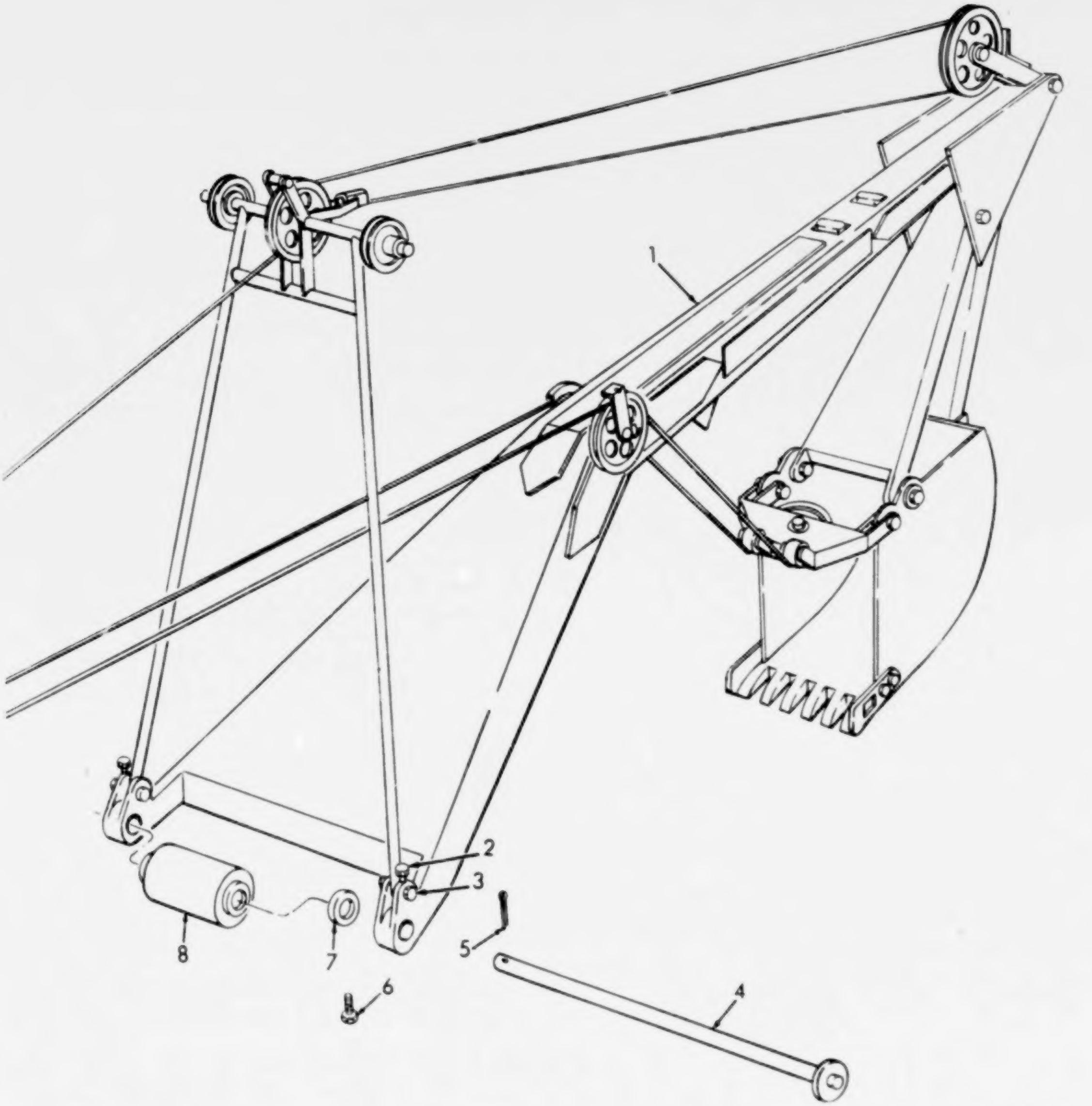
Figure 89—Continued.



EMC 3810-207-10/90

1 Wire rope, 5/8 in., 6 x 19 (56 ft rqr)
2 Wire rope, 5/8 in., 6 x 19 (35 ft rqr)
3 Clip, wire rope, 5/8 in. (3 rqr)
4 Thimble, rope, 5/8 in.
5 Weight
6 Hook block, 20 ton
7 Screw, cap (2 rqr)
8 Washer, lock, (2 rqr)
9 Lock (2 rqr)
10 Pin, cotter (2 rqr)
11 Wire rope, 5/8 in., 6 x 19 (170 ft rqr)
12 Pin, cotter (2 rqr)
13 Pin
14 Wire rope, 5/8 in., 6 x 19 (230 ft rqr)
15 Jib boom, 15 ft
16 Pin (2 rqr)

Figure 90. Basic issue items.



EMC 3810-207-10/91

1	Back hoe attachment	5	Pin, cotter
2	Setscrew	6	Setscrew, shaft collar
3	Pin	7	Shaft collar
4	Back hoe pin	8	Boom cable roller

Figure 91. Basic issue items.

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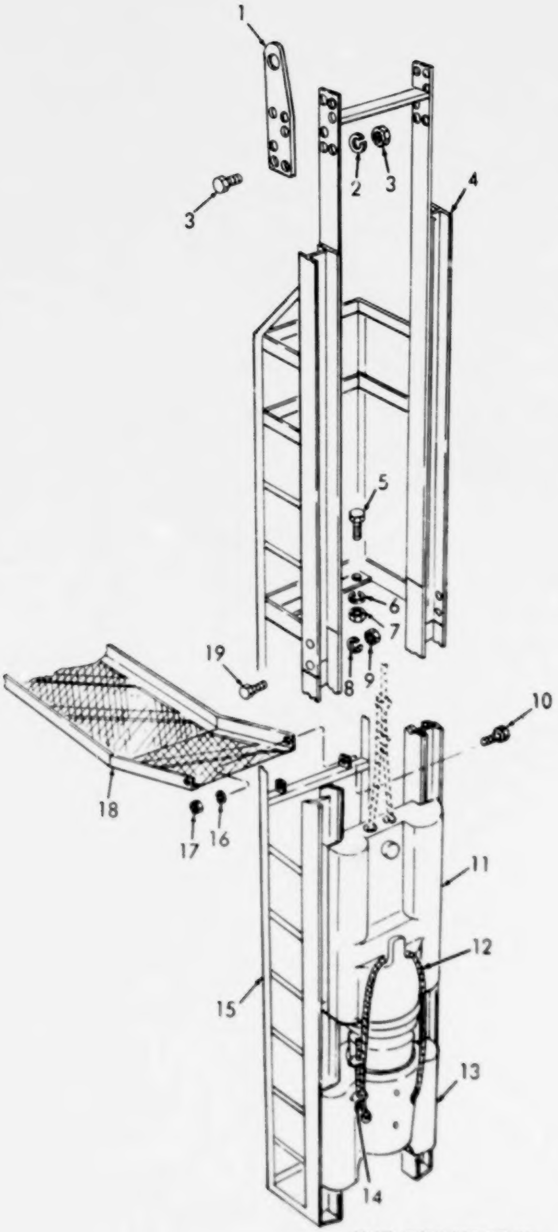

EMC 3810-207-10/92

1 Adapter
2 Washer, lock, split, 3/4 in. (12 rqr)
3 Bolt, machine, 3/4-10 x 1 3/4 in. (12 rqr)
4 Upper lead section

Figure 92. Basic issue items.

5 Screw, cap, 7/8-9 x 3 in. (4 rqr)
6 Washer, lock, 7/8 in. (4 rqr)
7 Nut, 7/8-9 (4 rqr)
8 Washer, lock, 3/4 in. (16 rqr)
9 Nut, 3/4-10 (16 rqr)
10 Screw, cap, 3/4-10 x 1 1/4 in. (4 rqr)
11 Pile driver hammer
12 Wire rope
13 Wood pile cap
14 Clip, wire rope, 5/8 in. (6 rqr)
15 Lower lead section
16 Washer, lock, split, 3/4 in. (4 rqr)
17 Nut, 3/4-10 (4 rqr)
18 Catwalk
19 Screw, cap, 3/4-10 x 2 in. (16 rqr)

Figure 92—Continued.

Section II. BASIC ISSUE ITEMS LIST

Source codes				Federal stock No.	Description	Unit of issue	Expendability	Quantity authorized	Quantity issued with equipment	Illustration	
Technical service	Source	Maintenance	Recoverability							Fig.	Item
					GROUP 06—ELECTRICAL SYSTEM (ENGINE AND VEHICULAR)						
					0612—BATTERIES						
9	P	O	--	6140-057-2554	BATTERY: Storage, 12 V, 6 cell.	--	NX	4	4		
9	P	O	--	6810-264-9063	SULPHURIC ACID: Electrolyte.	GAL	--	7	7		
					GROUP 26—ACCESSORIES, PUBLICATIONS, TEST EQUIPMENT AND TOOLS						
					2602.1—ACCESSORIES						
10	P	O	--	7520-559-9618	CASE: Maintenance and Operational Manuals, cotton duck, water repellent, mildew resistant; MIL B 11743B (GE)	--	--	1	1		
	P	O	--	6240-155-7790	LAMP: Incandescent, 28 V, 21 cp, double contact, bayonet candelabra base, S-8 clear bulb	--	--	1	1	86	19
	P	O	--	6230-268-9437	LIGHT: Extension, 2 conductor, water resistant, 16 AWG cable, 50 feet long. NEC type, POSJ-32 single contact bayonet fusible plug connector one end and lamp holder w/guard, reflector and two hooks other end, adjustable blackout shield.	--	--	1	1	86	20
					2602.2—COMMON TOOLS						
10	P	O	--	5120-240-8701	ADAPTER: Socket wrench, one end male 3/4 in. sq. other end female 1/2 in. sq opening.	--	--	1	*	86	21
10	P	O	--	5120-224-1389	BAR: Pry, rolling head, 1/2 in. dia, 16 in. lg.	--	--	1	*	86	14
10	P	O	--	5120-596-1019	BAR: Wrecking, 1 in. stock, 48 in. lg.	--	--	1	*	86	4
	P	O	--	8020-239-0959	BRUSH: Paint, oval, 1-7/16 x 1-1/16 inch tip.	--	--	1	*	86	24
10	P	O	--	5110-236-3272	CHISEL: Cold, hand, 3/4 in. cut, 7 in. lg.	--	--	1	*	86	9
10	P	O	--	5110-241-8807	CUTTER: Wire rope, hand operated, hammer impact, 1 in. maximum wire capacity.	--	--	1	*	86	8
10	P	O	--	5120-754-0840	DRIFT: Steel, round, brass tip, 3/4 in. dia, 10 in. lg.	--	--	1	*	86	16
10	P	O	--	5120-227-8074	EXTENSION: Socket wrench, 1/2 in. sq drive, 10 in. lg.	--	--	1	*	86	25
9	P	O	--	4910-273-3662	GAGE: Tire pressure, 10 to 160 lb range.	--	--	1	1	86	15
10	P	O	--	4930-360-2801	GREASE GUN: Hand, lever operated, 16 oz capacity.	--	--	1	1	86	7
10	P	O	--	5120-224-4046	HAMMER: Hand, machinist ball-peen, 1-1/4 lb head.	--	--	1	*	86	31

Source codes				Federal stock No.	Description	Unit of issue	Expendability	Quantity authorized	Quantity issued with equipment	Illustration	
Technical service	Source	Maintenance	Recoverability							Fig.	Item
10	P	O	--	5120–230–7858	HAMMER: Hand, blacksmith's double face 8 lb head.	--	--	1	•	86	18
10	P	O	--	5120–230–6385	HANDLE: Socket wrench, ratchet, 1/2 in. sq drive.	--	--	1	•	86	27
10	P	O	--	5120–251–1102	HANDLE: Wheel wrench, 3/4 in. dia, 20 in. lg.	--	--	1	•	86	2
10	P	O	--	4930–141–8311	HOSE ASSEMBLY: Grease gun, hydraulic coupling one end, other end male connection, 1/8 in. NPTF, 5/16 in. id hose, 19–11/32 in. overall length.	--	--	1	1	86	6
10	P	O	--	5120–188–1788	JACK: Automobile and motor truck, hydraulic, 20 ton.	--	--	1	•	86	5
10	P	O	--	5120–221–1536	KNIFE: Putty, flexible blade, 1–1/4 in. wide.	--	--	1	•	86	32
10	P	O	--	4930–262–8868	OILER: Hand, pump force fed 16 oz capacity, flexible spout.	--	--	1	1	86	3
10	P	O	--	5120–223–7396	PLIERS: Slip joint, straight nose, combination w/cutter, 6 in. lg.	--	--	1	•	86	29
10	P	O	--	5120–240–8876	PUNCH: Alining, 5/32 in. dia point, 8 in. lg.	--	--	1	•	86	30
9	X2	O	--	9510–189–0684	ROD: Steel, round, 1 in. dia, cold finished, 24 in. required; outrigger adjusting.	--	--	1	1	86	1
10	P	O	--	5120–293–3176	SCREWDRIVER: Flat tip, tip 1/4 in. wide, blade 4 in. lg.	--	--	1	•	86	28
10	P	O	--	5120–227–7349	SCREWDRIVER: Flat tip, tip 3/8 in. wide, 11–1/4 in. lg.	--	--	1	•	86	28
10	P	O	--	5120–189–7914	SOCKET: Socket wrench, 1/2 in. sq drive, 1–1/8 in. opening.	--	--	1	•	86	26
10	P	O	--	5120–261–2823	SOCKET: Socket wrench, deep, 3/4 in. sq drive, 1–5/8 in. opening.	--	--	1	•	86	23
10	P	O	--	5120–228–9505	WRENCH: Box and open end, combination, 15 degree offset, 7/16 in. opening.	--	--	1	•	86	17
10	P	O	--	5120–184–8642	WRENCH: Box and open end, combination, 15° offset, 9/16 in. opening.	--	--	1	•	86	17
10	P	O	--	5120–184–8643	WRENCH: Box and open end, combination, 15° offset, 5/8 in. opening.	--	--	1	•	86	17
10	P	O	--	5120–228–9509	WRENCH: Box and open end, combination, 15° offset, 11/16 in. opening.	--	--	1	•	86	17
10	P	O	--	5120–228–9510	WRENCH: Box and open end, combination, 15° offset, 3/4 in. opening.	--	--	1	•	86	17
10	P	O	--	5120–228–9513	WRENCH: Box and open end, combination, 15° offset, 15/16 in. opening.	--	--	1	•	86	17
10	P	O	--	5120–228–9516	WRENCH: Box and open end, combination, 15° offset, 1–1/8 in. opening.	--	--	1	•	86	17

Source codes				Federal stock No.	Description	Unit of issue	Expendability	Quantity authorized	Quantity issued with equipment	Illustration	
Technical service	Source	Maintenance	Recoverability							Fig.	Item
10	P	O	--	5120–228–9518	WRENCH: Box and open end, combination, 15° offset, 1–5/16 in. opening.	--	--	1	*	86	17
10	P	O	--	5120–227–8834	WRENCH: Box and open end, combination, 15° offset, 1–1/2 in. opening.	--	--	1	*	86	17
10	P	O	--	5120–322–6269	WRENCH: Drain plug, 90° offset, 1/2 in. sq male drive	--	--	1	*	86	10
10	P	O	--	5120–240–5328	WRENCH: Open end adjustable, 15/16 in. jaw opening, 8 in. lg.	--	--	1	*	86	13
10	P	O	--	5120–264–3796	WRENCH: Open end adjustable, 0 to 1.322 in. jaw opening, 12 in. lg.	--	--	1	*	86	13
10	P	O	--	5120–423–6728	WRENCH: Open end adjustable, 0 to 1.698 in. jaw opening, 15 in. lg.	--	--	1	*	86	13
10	P	O	--	5120–240–5331	WRENCH: Pipe, adjustable, 1/4 to 1 in. pipe capacity, 10 in. lg.	--	--	1	*	86	12
10	P	O	--	5120–240–5300	WRENCH: Socket head screw, hex, 3/16 in. across flats, L handle, 2–3/4 in. arm length.	--	--	1	*	86	11
10	P	O	--	5120–449–8258	WRENCH: Wheel stud nut, 1–1/2 in. hex, 13/16 in. sq x 14–1/2 in. lg.	--	--	1	*	86	22
					2602.4—PUBLICATIONS						
12	--	--	--	-------------	DEPARTMENT OF THE ARMY LUBRICATION ORDER LO 5–3810–207–20.	--	--	1	1		
12	--	--	--	-------------	DEPARTMENT OF THE ARMY OPERATOR'S MANUAL TM 5–3810–207–10.	--	--	2	2		
12	--	--	--	-------------	DEPARTMENT OF THE ARMY ORGANIZATIONAL MAINTENANCE MANUAL TM 5–3810–207–20.	--	--	2	2		
12	--	--	--	-------------	DEPARTMENT OF THE ARMY REPAIR PARTS AND SPECIAL TOOL LISTS TM 5–3810–207–20P.	--	--	2	2		
					Note. The following attachments are applicable to Crane-shovel, Quickway Model M–200, FSN 3810–542–4982 (unwinterized) and FSN 3810–542–4980 (winterized). These attachments are not basic issue items with FSN's 3810–542–4982 and 3810–542–4980 but are authorized by TOE, TA or other authorized documents.						
					GROUP 74—CRANES, SHOVELS OR EARTH WORKING EQUIPMENT						
					7400—SHOVEL FRONT ATTACHMENT						
				3815–524–5515	SHOVEL FRONT, CRANE-SHOVEL:	--	--	--	--	87A	4
					Note. Components of shovel front attachment which comprise jewelry kit are listed in Groups 7400.1, 7400.3, 7406.11, 7406.13 and 7499.						

Source codes				Federal stock No.	Description	Unit of issue	Expendability	Quantity authorized	Quantity issued with equipment	Illustration	
Technical service	Source	Maintenance	Recoverability							Fig.	Item
					7400.1—SHOVEL BOOM	--	--	--	--	87A	6
	X2	O	--	-------------	PIN: Boomfoot (77520) 37836.	--	--	2	•		
9	X2	O	--	5315–017–9097	PIN: Cotter, boomfoot pin.	--	--	2	•	87A	
					7400.3—CROWD AND RERACK MECHANISM						
	A	O	--	-------------	CHAIN: Roller, boomfoot sprocket to shipper shaft (77520) 21361.	--	--	1	•	87A	5
	A	O	--	-------------	CHAIN: Roller, crowd drum to boomfoot sprocket (77520) 21351.	--	--	1	•	87A	8
9	X2	O	--	5310–042–6754	NUT: Plain hexagon, 5/8–18 thd size; drum sprocket.	--	--	2	•	87A	2
9	X2	O	--	5305–018–1754	SCREW: Cap, hexagon head, 5/8–18 thd size x 1 in. lg drum sprocket.	--	--	8	•	87A	5
9	X2	O	--	5305–018–1766	SCREW: Cap, hexagon head, 5/8–18 thd size x 1–3/4 in. lg; drum sprocket.	--	--	2	•	87A	4
9	X2	O	--	5305–297–0745	SCREW: Cap, hexagon head, 3/4–16 thd size x 1–1/2 in. lg; tightener bracket mtg.	--	--	8	•	87B	1
	X2	O	--	-------------	SPROCKET: Drum, crowd (77520) 32001.	--	--	1	•	87C	1
	X2	O	--	-------------	TIGHTENER ASSEMBLY: Chain (77520) 17607.	--	--	1	•	87B	3
9	X2	O	--	5310–012–1574	WASHER: Lock, 5/8 in ----------------	--	--	12	•	87C	3
9	X2	O	--	5310–013–1046	WASHER: Lock, 3/4 in ----------------	--	--	8	•	87B	2
					7401.1—CRANE, DRAGLINE, OR CLAMSHELL BOOM						
					Note. Components of crane boom comprising jewelry kit are listed in Group 7401.1 and 7401.7.						
				3815–541–9839	BOOM: Crane, 30 ft, 20 ton ------------	--	--	--	--	88	3
	X2	O	--	-------------	PIN: Boomfoot attaching; (77520) 37835.	--	--	2	•	88	5
9	X2	O	--	5315–059–0237	PIN: Cotter, boomfoot pin --------------	--	--	2	•	88	4
	X2	O	--	3815–540–4756	EXTENSION: Crane boom, middle, 10 ft lg (GE).	--	--	1	•	88	11
9	X2	O	--	5310–022–0086	NUT: Plain hexagon, 3/4–10 thd size.	--	--	8	•	88	12
9	X2	O	--	5305–012–2909	SCREW: Cap, hexagon head, 3/4–10 thd size x 2 1/2 in. lg.	--	--	8	•	88	14
9	X2	O	--	5310–013–1046	WASHER: Lock, 3/4 in. screw size.	--	--	8	•	88	13
					7401.2—HOOK BLOCK						
	X2	O	--	3940–599–9977	HOOK BLOCK: 20 ton, 2 sheave (GE).	--	--	1	•	90	6
55	X2	O	--	4030–244–4524	WEIGHT: Overhauling, hook, hoist and swivel, 300 lb wt, 20 ton capacity.	--	--	1	•	90	5
					7401.3—TAGLINE						
	X2	O	--	3815–249–8387	TAGLINE: Crane and crane shovel (GE).	--	--	1	•	89A	2

Source codes				Federal stock No.	Description	Unit of issue	Expendability	Quantity authorized	Quantity issued with equipment	Illustration	
Technical service	Source	Maintenance	Recoverability							Fig.	Item
	X2	O	--	-------------	BOLT, U: W/plate, nuts and lockwashers; tagline mounting (89922) Y-41.	--	--	1	*	89A	4
	X2	O	--	-------------	PLATE: Clamping, w/bolts, nuts, and lockwashers; tagline mounting (89922) Y-42.	--	--	2	*	89A	3
					7401.4—CLAMSHELL BUCKET						
	X2	O	--	3815-186-3556	BUCKET: Clamshell, 3/4 cu yd w/teeth (GE).	--	--	1	*	89A	1
					7401.5—DRAGLINE BUCKET						
	X2	O	--	3815-186-3571	BUCKET: Dragline, 3/4 cu yd (GE).	--	--	1	*	89B	1
					7401.6—FAIRLEAD						
	X2	O	--	3815-554-0126	FAIRLEAD ASSEMBLY	--	--	1	*	89B	6
10	X2	O	--	5306-514-8460	BOLT, U: 1 in.-8 thd size, fairlead mtg.	--	--	4	*	89B	10
9	X2	O	--	5310-022-0088	NUT: Plain hexagon, 1 in.-8 thd size, U bolt.	--	--	8	*	89B	9
9	X2	O	--	5310-222-0087	NUT: Plain hexagon, 3/4-10 thd size, tube mounting.	--	--	8	*	89B	4
9	X2	O	--	5305-010-0211	SCREW: Cap, hexagon head, 3/4-10 thd size, 2 in. lg, tube mtg.	--	--	8	*	89B	2
	X2	O	--	-------------	SHIM: 1/16 in. thd fairlead U bolt, as rqr (77520) MS179-27.	--	--	--	--	89B	5
	X2	O	--	-------------	SHIM: 1/8 in. thd, fairlead U bolt, as rqr (77520) MS179-28.	--	--	--	--	89B	5
	X2	O	--	-------------	TUBE: Lower, fairlead mounting (77520) 10706-19.	--	--	1	*	89B	11
9	X2	O	--	5310-013-1048	WASHER: Lock, 1 in. id	--	--	8	*	89B	8
9	X2	O	--	5310-010-3333	WASHER: Lock, 3/4 in. id	--	--	8	*	89B	3
					7401.7—BOOM HARNESS						
	X2	O	--	-------------	PENDANT: Wire rope; 15 ft lg, MS179-6.	--	--	2	*	88	1
	X2	O	--	-------------	PENDANT: Wire rope, 10 ft lg, (77520) 10806-14.	--	--	2	*	88	15
	X2	O	--	-------------	PIN: Straight headed, pendant attaching, MS-179-7.	--	--	4	*	88	17
9	X2	O	--	5315-059-0237	PIN: Cotter, 3/8 in. dia x 3 in. lg, cadmium or zinc plated; pendant pin.	--	--	6	*	88	16
	X2	O	--	-------------	SPREADER ASSEMBLY: Pendant cable (77520) 3965.	--	--	1	*	88	2
					7402—JIB BOOM ASSEMBLY						
				3815-542-4839	BOOM, JIB: 15 ft (GE) *Note.* Components of jib boom assembly comprising jewelry kit are listed in Group 7402.3.	--	--	--	--	90	15
					7402.3—CABLES, PULLEYS, PINS, BUSHINGS						
	X2	O	--	3815-649-8467	LOCK: Jib to boom pin	--	--	2	*	90	9

Source codes				Federal stock No.	Description	Unit of issue	Expendability	Quantity authorized	Quantity issued with equipment	Illustration	
Technical service	Source	Maintenance	Recoverability							Fig.	Item
9	X2	O	--	5315–011–9203	PIN: Cotter, jib to boom pin ___________	--	--	2	*	90	10
9	X2	O	--	5315–011–9203	PIN: Cotter, mast to jib pin ___________	--	--	2	*	90	12
9	X2	O	--	5315–649–8470	PIN: Jib to boom ____________________	--	--	2	*	90	16
9	X2	O	--	5315–649–8471	PIN: Mast to jib ____________________	--	--	1	*	90	13
9	X2	O	--	5305–018–0122	SCREW: Cap, hexagon head, jib to boom pin lock.	--	--	2	*	90	7
9	X2	O	--	5310–012–0382	WASHER: Lock, jib to boom pin lock ____	--	--	2	*	90	8
55	P	O	--	4010–269–9329	WIRE ROPE: Steel, 5/8 in. dia, construction, 6 x 19 right regulator lay, preformed, lower jib support, 56 ft rqr.	ft	--	--	--	90	1
55	P	O	--	4010–269–9329	WIRE ROPE: Steel, 5/8 in. dia, construction, 6 x 19 right regular lay, preformed upper jib support, 35 ft rqr.	ft	--	--	--	90	2
					7403—BACK HOE ATTACHMENT						
				3815–542–5514	BACK HOE ATTACHMENT ___________	--	--	--	--	91	1
					Note. Components of back hoe attachment comprising jewelry kit are listed in groups 7403.1 and 7403.2.						
					7403.1—HOE BOOM						
	X2	O	--	____________	COLLAR: Shaft, boom foot (77520) 22417.	--	--	2	*	91	7
	X2	O	--	____________	PIN: Back hoe mounting (77520) 36987 __	--	--	1	*	91	4
9	X2	O	--	5315–043–6042	PIN: Cotter, back hoe mounting pin ______	--	--	1	*	91	5
	X2	O	--	____________	ROLLER: Boom cable, (77520) 41578 ____	--	--	1	*	91	8
9	X2	O	--	5305–010–2615	SETSCREW: Shaft collar ______________	--	--	2	*	91	6
					7403.2—MAST						
	X2	O	--	____________	PIN: Gantry to boom (77520) 37896 ______	--	--	2	*	91	3
9	X2	O	--	5305–010–2885	SETSCREW: Gantry to boom pin ________	--	--	2	*	91	2
					7404—PILE DRIVER ATTACHMENT						
	X2	O	--	3815–554–0083	ADAPTER: Pile driver lead ___________	--	--	2	*	92	1
9	X2	O	--	5306–208–9310	BOLT: Machine, hexagon head, 3/4–10 thd size, 1–3/4 in. lg w/hex nut.	--	--	12	*	92	3
	X2	O	--	3895–223–8840	CAP: Wood pile, for 3000 lb drop hammer.	--	--	1	*	92	13
	X2	O	--	3895–190–3308	CATWALK: Pile driver, telescoping, 8 to 23 ft.	--	--	1	*	92	18
55	X2	O	--	4030–243–4441	CLIP: Wire rope for 5/8 in. dia cable ____	--	--	6	*	92	14
	X2	O	--	3895–221–1771	HAMMER: Pile driver drop, 3000 lbs weight, jaw type guide, 8–1/4 in. jaws, 21 in. between jaws (GE).	--	--	1	*	92	11
	X2	O	--	3895–221–2217	LEAD SECTION: Top, pile driver, 20 ft lg, flange coupling (GE).	--	--	1	*	92	4
	X2	O	--	3895–221–2215	LEAD SECTION: Lower, pile driver, 10 ft lg, flange coupling (GE).	--	--	1	*	92	15
	X2	O	--	3895–221–2216	LEAD SECTION: Lower, pile driver, 15 ft lg, flange coupling (GE).	--	--	1	*	92	15

Source codes				Federal stock No.	Description	Unit of issue	Expendability	Quantity authorized	Quantity issued with equipment	Illustration	
Technical service	Source	Maintenance	Recoverability							Fig.	Item
9	X2	O	--	5310-042-6897	NUT: Plain hexagon, 3/4-10 thd size ----	--	--	4	*	92	17
9	X2	O	--	5310-042-6897	NUT: Plain hexagon, 3/4-10 thd size ----	--	--	16	*	92	9
9	X2	O	--	5310-012-3349	NUT: Plain hexagon, 7/8-9 thd size ------	--	--	4	*	92	7
9	X2	O	--	5305-696-5143	SCREW: Cap, hexagon head, 3/4-10 thd size, 1-1/4 in. lg.	--	--	4	*	92	10
9	X2	O	--	5305-042-8769	SCREW: Cap, hexagon head, 3/4-10 thd size, 2 in. lg.	--	--	16	*	92	19
9	X2	O	--	5305-579-0006	SCREW: Cap, hexagon head, 7/8-9 thd size, 3 in. lg.	--	--	4	*	92	5
9	X2	O	--	5310-010-3332	WASHER: Lock, split 3/4 in. bolt size --	--	--	12	*	92	2
9	X2	O	--	5310-010-3332	WASHER: Lock, split 3/4 in. screw size --	--	--	4	*	92	16
9	X2	O	--	5310-010-3332	WASHER: Lock, split 3/4 in. screw size --	--	--	16	*	92	8
9	X2	O	--	5310-013-8566	WASHER: Lock, split, 7/8 in. screw size --	--	--	4	*	92	6
55	X2	O	--	4010-269-9329	WIRE ROPE: Steel, 5/8 in. dia, construction, 6 x 19 right regular lay, preformed, cap to hammer sling, 9 ft required.	ft	--	--	--	92	12
					7406.11—DIPPER TRIP						
	A	O	--	-------------	TRIP ASSEMBLY: (77520) 817 --------	--	--	1	*	87D	9
					Note. The items listed below in this group are components of trip assembly.						
	X2	O	--	-------------	BRACKET: Guide pulley (77520) 17657 --	--	--	1	*	87D	17
	X2	O	--	-------------	CAM: Trip (77520) 14307 -------------	--	--	1	*	87D	5
	X2	O	--	-------------	KEY: Machine, cam to shaft (77520) 34207.	--	--	1	*	87D	8
9	X2	O	--	5310-022-5831	NUT: Plain hexagon, 3/8-24 thd size; trip assembly mtg.	--	--	4	*	87D	11
9	X2	O	--	5310-022-0073	NUT: Plain hexagon, 1/2-13 thd size; guide pulley bracket mtg.	--	--	2	*	87D	18
9	X2	O	--	5310-012-1965	NUT: Plain hexagon, 1/2-20 thd size; cam mtg.	--	--	1	*	87D	7
	X2	O	--	-------------	PIN: Guide pulley (77520) 37936 --------	--	--	1	*	87D	22
9	X2	O	--	5315-012-1673	PIN: Cotter, 7/64 in. dia, 1 in. lg --------	--	--	2	*	87D	21
	X2	O	--	-------------	PULLEY: Guide (77520) 40186 ----------	--	--	1	*	87D	20
9	X2	O	--	5305-018-1637	SCREW: Cap, hexagon head, 3/8-24 thd size, 1 in. lg; trip assembly mtg.	--	--	4	*	87D	13
9	X2	O	--	5305-018-0177	SCREW: Cap, hexagon head, 1/2-13 thd size, 1-1/2 in. lg; guide pulley brkt.	--	--	2	*	87D	16
9	X2	O	--	5305-012-4174	SCREW: Cap, hexagon head, 1/2-20 thd size, 2-1/4 in. lg; cam mtg.	--	--	1	*	87D	4
9	X2	O	--	5310-011-5093	WASHER: Lock, 3/8 in. screw size; trip assembly mtg.	--	--	4	*	87D	12
9	X2	O	--	5310-012-0384	WASHER: Lock, 1/2 in. screw size; cam mtg and guide pulley mtg.	--	--	1	*	87D	6

Source codes				Federal stock No.	Description	Unit of issue	Expendability	Quantity authorized	Quantity issued with equipment	Illustration	
Technical service	Source	Maintenance	Recoverability							Fig.	Item
					7406.14—MACHINERY MECHANISM CONTROLS						
	X2	O	--	-------------	LEVER: Hand control, dipper trip (77520) 34736.	--	--	1	*	87D	3
	X2	O	--	-------------	LINK: Control lever to cable (77520) 36316.	--	--	1	*	87D	1
9	X2	O	--	5310-021-8584	NUT: Plain hexagon, 1/4-28 thd size; pulley mounting.	--	--	4	*	87D	23
9	X2	O	--	5315-276-4346	PIN: Straight, headed, 3/8 in. dia, 1-3/32 lg; control lever.	--	--	2	*	87D	2
9	X2	O	--	5315-290-6228	PIN: Cotter, 3/32 in. dia, 3/4 in. lg; control lever pin.	--	--	2	*	87D	28
	X2	O	--	-------------	PULLEY: Trip cable lever (77520) 40189.	--	--	1	*	87D	25
	X2	O	--	-------------	PULLEY: Control cable (77520) 40150 --	--	--	1	*	87D	15
9	X2	O	--	5305-018-1573	SCREW: Cap, hexagon head, 1/4-28 thd size, 1-1/4 in. lg; control cable pulley mtg.	--	--	4	*	87D	26
9	X2	O	--	5310-012-0387	WASHER: Flat, 3/8 in. screw size; lever pin.	--	--	2	*	87D	27
9	X2	O	--	5310-012-0380	WASHER: Lock, 1/4 in. screw size; pulley mtg.	--	--	4	*	87D	24
					7406.17—SAFETY BOOM STOP						
	A	O	--	-------------	STOP ASSEMBLY: Safety boom (77520) 4401.	--	--	1	*	88	6
	X2	O	--	-------------	ANCHOR: Lower cable (77520) 10066.	--	--	2	*	88	7
	X2	O	--	-------------	CLAMP: Boom stop spring to boom (77520) 21953.	--	--	2	*	88	10
	X2	O	--	-------------	PIN: Cable anchor (77520) 37520 --------	--	--	4	*	88	9
9	X2	O	--	5315-010-3422	PIN: Cotter, anchor pin ---------------	--	--	4	*	88	8
					7499—CABLE AND ROPES						
55	X2	O	--	-------------	CLIP: Wire rope, steel, galvanized; used with 1/8 in. dia wire rope; dipper trip (77520) 21964.	--	--	2	*	87D	10
55	X2	O	--	4030-243-4438	CLIP: Wire rope, steel, galvanized; used with 5/16 in. dia wire rope; dipper trip.	--	--	4	*	87D	29
55	X2	O	--	4030-243-4441	CLIP: Wire rope, steel, galvanized; used with 5/8 in. dia wire rope; hook.	--	--	3	*	90	3
55	X2	O	--	4030-356-3700	THIMBLE: Rope, split, oval steel, galvinized; designed for wire rope, 5/16 in. dia.	--	--	2	*	87D	30
55	X2	O	--	4030-282-2513	THIMBLE: Rope, split, oval steel, galvanized; designed for wire rope, 5/8 in. dia.	--	--	1	*	90	4
55	P	O	--	4010-202-1347	WIRE ROPE: Steel, 1/8 in. dia, construction, 7 x 19, corrosion resistant steel; dipper trip actuating 9 ft required.	ft	--	--	--	87D	14

Source codes				Federal stock No.	Description	Unit of issue	Expendability	Quantity authorized	Quantity issued with equipment	Illustration	
Technical service	Source	Maintenance	Recoverability							Fig.	Item
55	P	O	--	4010-274-6842	WIRE ROPE: Steel, 5/16 in. dia, construction, 6 x 37, regular lay, zinc coated; dipper trip; 14 ft 7 in. required.	ft	--	--	--	87A	3
55	P	O	--	4010-274-6842	WIRE ROPE: Steel, 5/16 in. dia, construction, 6 x 37, regular lay, zinc coated; dipper trip; 13 ft 2 in. required.	ft	--	--	--	87D	19
55	P	O	--	4010-274-6824	WIRE ROPE: Steel, 5/8 in. dia, construction, 6 x 19 left regular lay; shovel hoist; 75 ft required.	ft	--	--	--	87A	2
55	P	O	--	4010-269-9328	WIRE ROPE: Steel, 9/16 in. dia, construction, 6 x 19 right regular lay, preformed; shovel boom hoist or crane boom hoist, 198 ft required.	ft	--	--	--	87A	1
55	P	O	--	4010-274-6824	WIRE ROPE: Steel, 9/16 in. dia, construction 6 x 19 left regular lay, preformed, dragline pull cable, 75 ft required.	ft	--	--	--	89B	7
55	P	O	--	4010-274-6824	WIRE ROPE: Steel, 5/8 in. dia, construction, 6 x 19 left regular lay, performed, crane secondary cable for 30 ft boom 230 ft required.	ft	--	--	--	90	14
55	P	O	--	4010-269-9329	WIRE ROPE: Steel, 5/8 in. dia, construction, 6 x 19 right regular lay, preformed, crane primary cable for 30 ft boom, 170 ft required. *Note.* Primary and secondary crane cables as listed above are adequate for all crane operations with 30 ft boom. For each 10 ft increase in boom length add 20 ft. to secondary cable and 50 ft to primary cable.	ft	--	--	--	90	11
					GROUP 76—FIREFIGHTING EQUIPMENT *7603—FIRE EXTINGUISHERS*						
	P1	O	--	4210-223-9912	EXTINGUISHER: Fire, carbon, dioxide, std charged; hand; nonshatterable cylinder, permanent shutoff valve; button, squeeze grip or trigger control; 5 lb MIL Spec E-468, type 1, class 1.	--	--	(see	note)		
	P1	O	--	4210-893-1092	EXTINGUISHER: Fire, dry chemical, charged, hand, pressurized w/dry air or nitrogen gas; w/pressure gauge; squeeze grip control; steel cylinder, enameled red; factory mutual or UL approved, class 4-B, C; 2-1/2 lb; w/universal bracket. *Note.* Requisition CO_2 extinguisher until depot stocks are exhausted.	--	--	1	*		

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NG: None.

USAR: Same as active Army except allowance is one copy to each unit.

For explanation of abbreviations used, see AR 320–50.

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